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GLOBAL DATA MONITORING REPORT

June 2003

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

Figure		Weighting function peak (hPa)
56	Mean	Surface (HIRS8)
57	SD	Surface (HIRS8)
58	Mean	700 (HIRS15)
59	SD	700 (HIRS15)
60	Mean	500-700 (HIRS11)
61	SD	500-700 (HIRS11)
62	Mean	400 (HIRS4)
63	SD	400 (HIRS4)
64	Mean	700 (AMSUA5)
65	SD	700 (AMSUA5)
66	Mean	300 (AMSUA7)
67	SD	300 (AMSUA7)
68	Mean	100 (AMSUA9)
69	RMS	100 (AMSUA9)

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
CG2522	P	606	79	94	3.7	-7.7	8.5
CG2556	P	26	0	100	0.7	-11.0	11.0
CTEC	P	23	48	100	1.9	-13.3	13.4
C6FE6	P	45	0	100	1.0	-4.3	4.5
C6SI4	P	22	0	0	0.9	4.5	4.6
DICB	P	28	0	93	1.0	5.0	5.1
DIHN	P	24	0	63	2.3	4.1	4.7
DPUW	P	46	2	70	0.8	4.3	4.3
DQVO	P	32	0	72	1.2	4.6	4.7
D5XH	P	20	0	10	2.0	-4.0	4.5
ELYD5	P	20	0	60	2.7	-4.4	5.2
KMJL	P	51	2	6	2.0	-4.4	4.8
KS008	P	62	0	42	4.3	-4.3	6.0
OWDD	P	75	1	64	3.4	-4.4	5.6
SHIPDO	P	23	78	78	0.8	-0.1	0.8
S6HU8	P	49	0	2	1.2	4.0	4.2
UCJB	P	38	0	0	1.1	-4.6	4.7
UCJL	P	28	0	0	1.0	4.4	4.5
UCJS	P	22	0	55	0.6	-5.2	5.3
UCTP	P	21	0	10	0.8	4.0	4.1
UCUC	P	39	100	100			
UDKC	P	22	0	50	1.5	4.2	4.5
UFAA	P	20	5	85	1.8	5.5	5.8
UHLE	P	44	5	5	1.4	-8.2	8.3
VCLX	P	24	100	100			
VMGO	P	24	0	100	2.9	5.2	5.9
VVGG	P	21	0	24	3.6	4.0	5.4
V2KU	P	43	9	35	6.4	-3.4	7.2
WDCJ	P	34	0	3	1.1	6.9	7.0
WQB6160	P	26	4	50	4.3	-4.7	6.4
3FOC5	P	40	0	0	1.2	5.8	5.9
4XFX	P	24	4	4	0.9	4.4	4.5
62166	P	74	1	42	4.2	5.2	6.7

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
ELTY4	SPEED	26	0	42	6.4	8.6	10.7
ELYL8	SPEED	32	3	13	3.4	5.8	6.7
ELZX7	SPEED	20	0	30	5.9	7.1	9.2
KS004	SPEED	26	0	100	1.5	-5.3	5.5
KS006	SPEED	56	0	100	1.5	-5.3	5.5
KS010	SPEED	45	0	100	1.4	-6.1	6.3
OVYB2	SPEED	46	0	24	5.2	6.3	8.2
VTXK	SPEED	34	0	100	5.1	5.3	7.4
ZCBJ5	SPEED	26	0	42	8.4	9.8	12.9

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
A8AV9	DIRN.	27	4	0	56.2	36.6	67.0
MMHE5	DIRN.	20	0	0	53.6	35.0	64.0
PJLC	DIRN.	36	0	0	29.9	34.0	45.2
23168	DIRN.	29	0	0	52.3	89.7	103.8

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
CG2350	SST	229	2	100	2.0	3.5	4.0
CG2522	SST	600	88	97	1.4	5.0	5.2
CG2960	SST	241	14	100	3.2	3.4	4.7
CG2992	SST	527	100	100			
CG8048	SST	55	100	100			
DBBX	SST	568	33	100	1.4	-0.9	1.6
DBBXX	SST	37	30	100	1.1	-0.7	1.3
DBFC	SST	526	34	36	1.8	-0.3	1.9
DGCP	SST	31	0	45	1.0	3.7	3.8
EIQN	SST	579	51	100	0.8	1.0	1.3

FNJI	SST	90	1	100	1.2	3.6	3.8
H9TO	SST	38	3	100	0.5	3.0	3.1
KRPB	SST	58	0	100	1.9	-3.8	4.2
KS011	SST	222	0	87	1.5	5.8	6.0
KS025	SST	196	57	57	0.9	0.5	1.1
MZIF7	SST	28	0	100	0.6	3.0	3.0
OUEV	SST	107	16	49	2.8	3.2	4.3
OZIA	SST	82	2	87	2.1	6.6	6.9
PDYI	SST	29	3	38	1.7	-3.5	3.8
P3KT8	SST	47	0	49	2.4	3.2	4.0
SLCH	SST	21	0	100	0.6	3.1	3.1
TSMS	SST	94	0	68	1.0	-4.4	4.5
UBLX	SST	24	4	79	1.6	-5.7	5.9
UCBM	SST	58	0	34	2.6	-3.0	3.9
VCTX	SST	38	37	45	2.4	0.8	2.5
VOCJ	SST	208	0	100	2.1	4.6	5.1
VQEN2	SST	27	26	30	2.4	1.0	2.6
V7DN3	SST	52	0	52	1.4	-3.7	4.0
V7DP7	SST	28	0	100	2.0	-4.4	4.9
WCW9126	SST	41	100	100			
WCZ5528	SST	60	0	50	3.2	-3.5	4.7
WN4201	SST	20	70	70	1.2	-1.2	1.7
WPVD	SST	51	0	100	1.2	4.3	4.5
WWU8	SST	37	100	100			
YJQL3	SST	37	0	100	1.1	-4.1	4.2
44141	SST	559	0	85	2.1	3.7	4.2
44150	SST	612	0	52	1.3	3.2	3.5
45140	SST	682	100	100			
45142	SST	659	0	100	1.4	3.3	3.5
45144	SST	458	88	100	0.4	9.0	9.0
45145	SST	573	100	100			
45147	SST	684	100	100			
45148	SST	402	100	100			
45151	SST	506	4	100	1.2	7.3	7.4
45152	SST	541	100	100			
45154	SST	195	15	91	1.6	5.4	5.7
46131	SST	660	100	100			
46146	SST	679	100	100			
46181	SST	656	100	100			

Figure 1. SHIP/SYNOP mean daily count. JUNE 2003
All hours
Global average number of observations in 24 hours = 20413

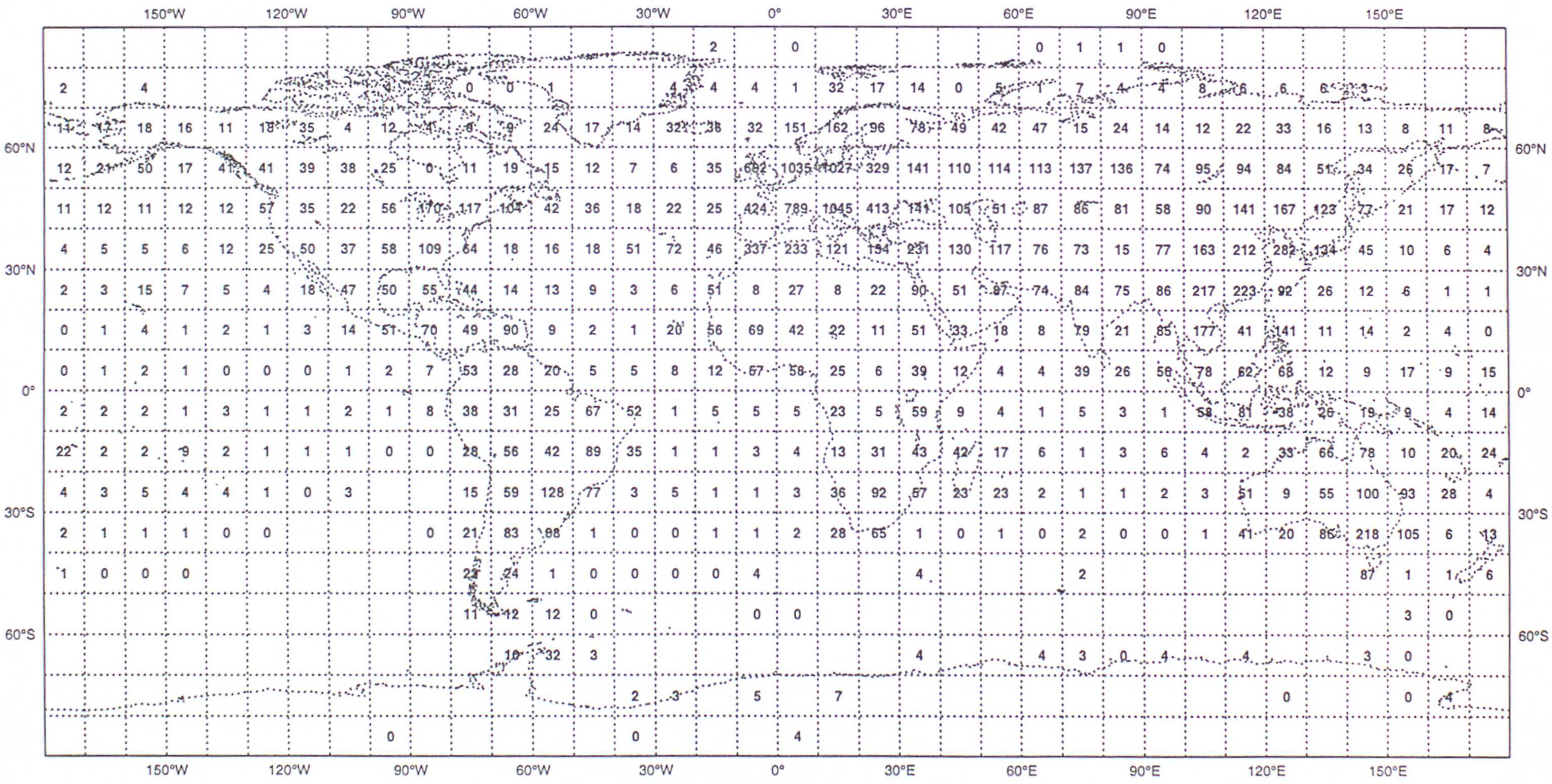

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period		:One calendar month.	
Data monitored		:Reports from each unique identifier for drifting buoys.	
Standard of comparison		:Background field from UKMO global model.	
Position		:Average latitude and longitude for period.	
Observation times		: All hours	
Elements monitored		:Mean sea level pressure (hPa). :Wind speed ($m\ s^{-1}$). :Wind direction (degrees). :Sea surface temperature (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.	
	:PGE	:Percentage of observations with gross errors.	
	:%REJ	: Percentage of observations flagged excluding those with gross errors	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa :25 $m\ s^{-1}$:10 degrees	(pressure) (vector wind) (sea surface temperature)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa ≥ 5 $m\ s^{-1}$ ≥ 30 degrees ≥ 3 degrees	(pressure), (wind speed), (direction). (sea surface temperature).
	2.SD	≥ 6 hPa ≥ 80 degrees ≥ 5 degrees	(pressure), (direction). (sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
33512	-35.6	-41.5	P	268	81	100	5.6	-5.9	8.1
33614	-52.1	-30.8	P	689	31	48	3.8	-1.7	4.1
41649	16.3	-61.1	P	554	0	100	0.6	-4.3	4.4
61670	35.2	21.7	P	45	76	93	5.3	-8.4	9.9
61673	41.9	28.0	P	41	59	100	6.7	-1.8	6.9
61679	41.4	36.6	P	362	42	72	5.5	4.5	7.1
62696	49.9	-46.6	P	471	46	80	4.8	3.7	6.0

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
21907	40.9	145.8	SPEED	1208	0	100	6.3	5.2	8.1
21909	41.1	153.0	SPEED	1313	2	100	5.5	5.0	7.5
41503	20.5	-73.7	SPEED	569	65	100	5.0	3.0	5.9
52516	26.2	142.3	SPEED	67	1	100	5.5	5.0	7.5
52657	24.8	150.2	SPEED	521	29	100	7.2	9.5	11.9

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
13600	16.7	-24.6	DIRN.	404	0	0	16.5	34.2	37.9
21909	41.1	153.0	DIRN.	579	3	0	45.7	57.7	73.6
21910	43.3	158.6	DIRN.	703	1	0	51.8	40.6	65.8
41531	25.1	-59.6	DIRN.	265	0	0	10.8	34.7	36.4
41532	22.3	-68.1	DIRN.	501	0	0	10.8	38.0	39.6
44585	42.9	-69.0	DIRN.	332	10	0	54.3	49.5	73.5

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
17563	-28.8	-7.2	SST	285	100	100			
31926	0.7	78.0	SST	28	21	100	0.2	-8.6	8.6
32526	10.0	-84.8	SST	52	100	100			
33502	-28.9	-17.4	SST	146	5	100	0.3	3.5	3.6
41574	38.1	-69.4	SST	74	23	62	3.5	-3.6	5.0
44614	59.4	-42.6	SST	1400	2	100	3.6	3.5	5.0
44726	60.2	-47.8	SST	1504	3	60	2.5	3.5	4.3
44837	42.3	-64.5	SST	55	44	95	3.9	5.1	6.5
44838	40.6	-45.9	SST	52	100	100			
44839	40.7	-39.4	SST	51	100	100			
46780	62.0	-178.7	SST	1300	8	100	1.0	3.1	3.3
46972	19.2	-155.6	SST	279	4	100	0.6	4.7	4.8
51642	-9.0	-176.4	SST	325	93	95	3.0	-1.2	3.3
51832	-13.3	-159.6	SST	31	26	100	2.7	-7.5	8.0

Figure 2. DRIFTER mean daily count. JUNE 2003
All hours
Global average number of observations in 24 hours = 11380

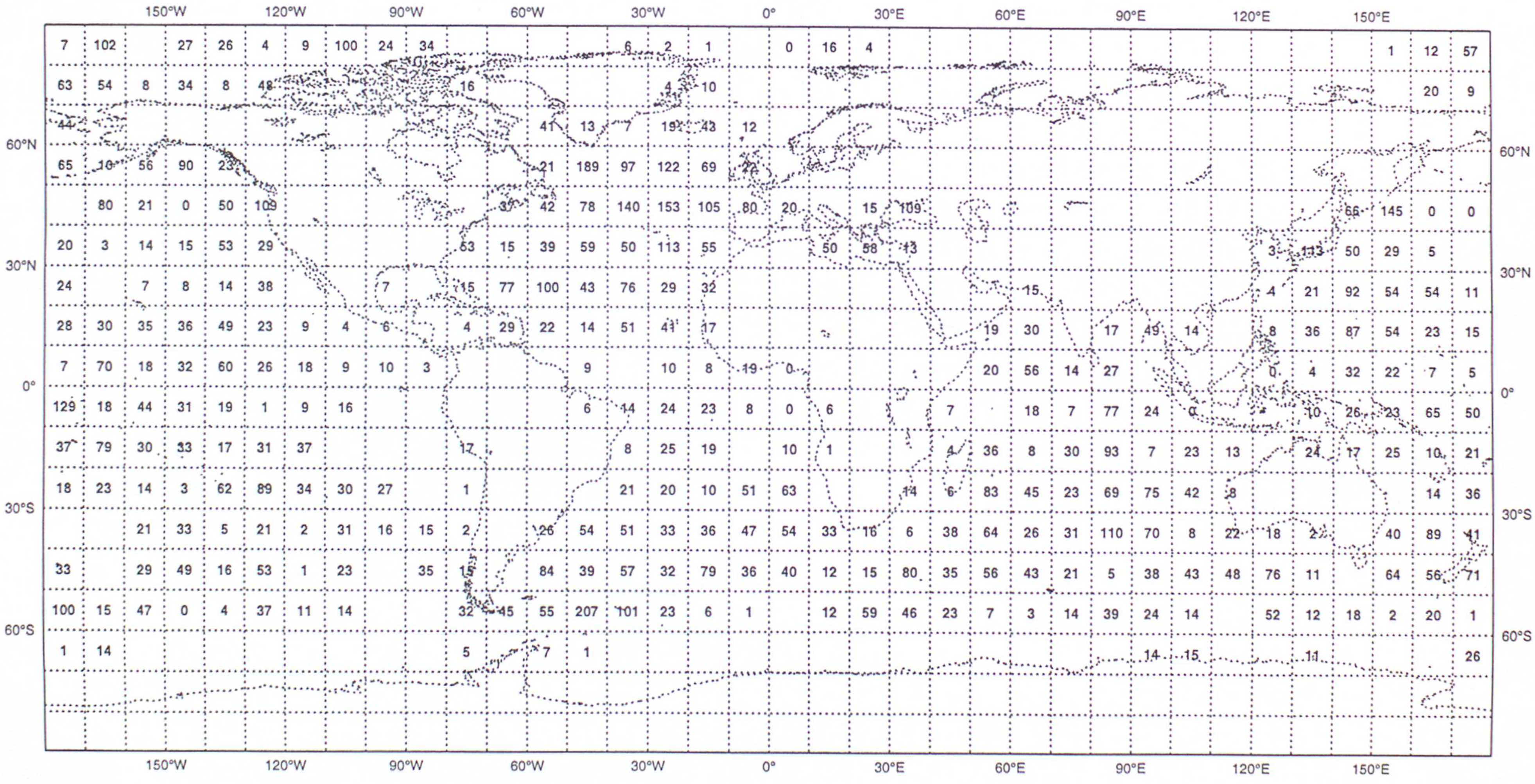

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
7 102 27 26 4 9 100 24 34 6 2 1 0 16 4 1 12 57
63 54 8 34 8 48 16 4 10 20 9
44 41 13 7 19 43 12
65 16 56 90 23 21 189 97 122 69 22
80 21 0 50 109 37 42 78 140 153 105 80 20 15 109 66 145 0 0
20 3 14 15 53 29 53 15 39 59 50 113 55 50 58 13 3 113 50 29 5
24 7 8 14 38 7 15 77 100 43 76 29 32 15 4 21 92 54 54 11
28 30 35 36 49 23 9 4 6 4 29 22 14 51 41 17 19 30 17 49 14 8 36 87 54 23 15
7 70 18 32 60 26 18 9 10 3 9 10 8 19 0 20 56 14 27 0 4 32 22 7 5
129 18 44 31 19 1 9 16 6 14 24 23 8 0 6 7 18 7 77 24 0 10 26 23 65 50
37 79 30 33 17 31 37 17 8 25 19 10 1 4 36 8 30 93 7 23 13 24 17 25 10 21
18 23 14 3 62 89 34 30 27 1 21 20 10 51 63 14 6 83 45 23 69 75 42 8 14 36
21 33 5 21 2 31 16 15 2 26 54 51 33 36 47 54 33 16 6 38 64 26 31 110 70 8 22 18 2 40 89 41
33 29 49 16 53 1 23 35 15 84 39 57 32 79 36 40 12 15 80 35 56 43 21 5 38 43 48 76 11 64 56 71
100 15 47 0 4 37 11 14 32 45 55 207 101 23 6 1 12 59 46 23 7 3 14 39 24 14 52 12 18 2 20 1
1 14 5 7 1 14 15 11 26

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

SUSPECT SYNOPS (PRESSURE) BY WMO REGION JUN 200

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60728	36.4N	10.7E	1	MS	59	1	2	2	0.6	-8.6	8.6
61492	16.1N	13.5W	18	M	38	0	0	0	1.5	5.2	5.4
63330	13.5N	39.5E	2070	MS	22	22	100	0			
63333	11.1N	39.7E	1903	MS	22	0	0	0	0.7	5.6	5.6
63334	10.3N	37.7E	2515	MS	22	1	5	0	0.7	11.6	11.6
63450	9.0N	38.8E	2354	MS	23	0	0	0	0.8	5.4	5.5
63453	8.9N	39.9E	930	S	23	0	0	0	1.2	-4.4	4.6
63478	5.9N	43.6E	295	MS	21	0	0	14	0.9	5.1	5.2
63801	4.9S	29.6E	882	S8	52	1	2	2	0.8	7.5	7.5
63881	8.0S	31.6E	1923	S	43	0	0	0	0.5	12.6	12.6
65125	9.3N	7.0E	344	M	31	0	0	16	1.0	4.0	4.1
65355	9.8N	1.1E	342	MS	96	2	2	1	0.8	-12.4	12.4
67223	13.1S	39.0E	534	S8	60	2	3	2	1.4	12.3	12.4
68014	19.6S	18.1E	1411	S8	66	1	2	0	0.8	-7.2	7.2
68030	18.5S	25.6E	1071	8	85	0	0	0	4.1	8.1	9.1
68312	26.5S	18.1E	1067	S8	67	0	0	3	1.2	4.6	4.8
68338	26.9S	24.6E	1234	S8	52	52	100	0			
68396	26.5S	31.3E	641	S8	55	0	0	7	1.7	4.6	4.9
68575	30.0S	30.0E	1175	S8	113	113	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30554	54.5N	113.6E	995	MS	116	1	1	0	5.3	5.5	7.6
36982	41.9N	78.2E	3635	S7	103	1	1	0	0.8	6.8	6.8
38565	40.6N	65.7E	485	M	114	53	46	0	1.5	0.0	1.5
38954	37.5N	71.5E	2077	8	22	0	0	0	1.8	-4.0	4.4
40435	24.5N	44.4E	991	MS	49	0	0	100	0.5	7.4	7.4
40700	39.6N	47.9E	45	MS	103	0	0	0	1.0	-5.2	5.3
40713	37.4N	46.3E	1475	MS	104	23	22	1	1.6	14.0	14.1
40726	36.8N	45.7E	1384	MS	104	0	0	0	1.0	4.0	4.1
40741	36.5N	61.2E	235	MS	104	0	0	1	1.1	-4.5	4.6
40780	33.6N	46.4E	1362	MS	102	0	0	0	0.7	5.4	5.4
41254	23.1N	57.6E	1755	S8	76	75	99	0	0.0	-9.8	9.8
44265	46.1N	91.5E	1186	MS	113	0	0	0	0.6	6.3	6.3
47022	40.8N	128.2E	1224	S	83	2	2	2	1.0	4.4	4.5
48924	21.1N	101.5E	644	S	28	0	0	0	0.5	11.1	11.1
48925	20.7N	102.0E	550	S	36	0	0	0	0.6	-10.0	10.0
48938	19.2N	101.7E	326	MS	39	30	77	0	0.6	14.3	14.3
48957	14.8N	106.8E	105	S	27	0	0	0	0.7	4.2	4.3
50727	47.2N	119.9E	1028	MS	115	0	0	0	0.7	4.4	4.5
51495	43.2N	91.7E	874	M	93	0	0	0	1.1	6.5	6.6
52866	36.6N	101.8E	2262	S	116	0	0	0	0.7	-4.2	4.3
56462	29.0N	101.5E	2994	S	116	0	0	0	1.1	8.4	8.5
56768	25.0N	101.5E	1773	S	115	0	0	0	0.6	-5.4	5.4
57816	26.6N	106.7E	1074	MS	116	44	38	0	0.4	-14.5	14.5

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	122	MS	30	0	0	0	1.4	-6.6	6.7
82181	2.0S	54.1W	146	MS	84	0	0	0	0.6	4.9	4.9
82704	7.6S	72.7W	170	MS	82	0	0	2	1.6	-4.6	4.9
83235	12.4S	46.4W	604	MS	86	0	0	0	0.5	6.3	6.3

83332	14.1S	46.4W	826	MS	84	7	8	0	0.4	14.2	14.2
83470	17.9S	50.9W	727	MS	83	0	0	0	0.6	-5.6	5.6
83531	18.6S	46.5W	940	MS	84	0	0	0	0.7	-7.2	7.2
83836	25.5S	50.6W	837	MS	85	0	0	0	0.7	-5.3	5.3
84455	6.5S	76.4W	281	MS	83	0	0	0	1.1	7.0	7.1
84472	7.1S	78.5W	2620	S	51	0	0	0	0.6	-5.4	5.4
84474	7.2S	76.7W	350	S	25	0	0	0	0.7	9.3	9.3
84686	13.6S	72.0W	3248	S	111	0	0	0	0.8	-4.8	4.9
84688	13.7S	73.4W	3444	S	47	0	0	0	0.4	-12.7	12.7
84720	14.9S	75.0W	567	MS	51	0	0	0	0.8	5.6	5.7
84782	18.1S	70.3W	468	MS	89	0	0	0	1.3	8.8	8.9
85140	14.3S	67.4W	140	MS	49	0	0	0	0.8	6.2	6.3
85264	18.5S	64.1W	1998	S	51	5	10	8	1.0	-12.7	12.7
85312	19.8S	63.9W	992	S	38	1	3	0	1.4	-11.9	12.0
85406	18.3S	70.3W	55	M	115	0	0	0	1.0	5.1	5.2
85432	22.5S	68.9W	2320	S8	79	0	0	0	0.6	4.7	4.7

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71048	61.6N	125.8W	610	MS	114	0	0	0	1.0	4.3	4.4
71049	66.0N	91.8W	150	MS	115	47	41	0	1.0	13.9	13.9
71181	47.1N	55.3W	29	MS	116	0	0	0	0.7	-6.1	6.1
71475	49.3N	124.8W	2	MS	113	0	0	0	0.8	-8.3	8.3
71747	48.8N	91.6W	424	MS	115	0	0	0	0.6	4.2	4.2
72327	36.1N	86.7W	182	MS	115	0	0	0	0.6	4.1	4.1
76055	31.0N	114.9W	440	MS	68	68	100	0			
76543	22.0N	98.8W	104	MS	21	0	0	0	0.8	6.9	6.9
76658	19.2N	103.7W	494	MS	34	0	0	0	0.7	5.8	5.8
76683	19.3N	98.3W	2248	MS	73	0	0	1	1.1	4.3	4.4
76762	17.5N	99.5W	1265	MS	69	0	0	0	0.8	5.9	6.0
76840	16.2N	93.9W	48	MS	38	1	3	3	1.3	4.2	4.4
76903	14.9N	92.3W	118	MS	76	0	0	0	0.9	6.5	6.6
78588	17.2N	87.5W	-266	M	114	92	81	0	0.7	-0.2	0.7

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
94130	14.8S	131.9E	120	MS	116	0	0	0	1.2	5.5	5.6
94541	29.8S	151.1E	584	MS	115	0	0	0	0.7	-9.2	9.2
96505	3.7N	115.7E	937	S8	27	26	96	0	0.0	-0.3	0.3
97378	10.7S	123.1E	1	MS	48	48	100	6			

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	711	MS	115	0	0	0	0.6	6.0	6.0
01393	61.9N	12.1E	672	MS	47	24	51	0	0.5	0.1	0.5
06685	47.0N	9.1E	515	MS	117	0	0	3	1.2	5.3	5.4
06780	46.8N	9.8E	2690	S7	117	0	0	0	0.6	4.8	4.8
08912	42.9N	0.8W	1434	MS	339	339	100	0			
08922	42.8N	0.2W	1660	MS	336	336	100	0			
10850	48.8N	10.7E	457	MS	342	0	0	0	0.6	-5.3	5.3
13269	44.3N	19.9E	176	MS	105	1	1	0	0.6	7.2	7.2
14554	44.9N	18.4E	136	S	54	2	4	0	0.6	-12.7	12.7
14650	43.8N	18.0E	970	S	53	19	36	98	0.6	-11.0	11.0
16538	40.1N	9.3E	1022	S	32	0	0	0	0.7	9.1	9.1
17203	38.9N	40.5E	1177	S8	115	0	0	0	0.9	4.8	4.9

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	89	0	0	0	1.5	-7.1	7.3
89263	66.0S	66.1W	20	M	259	14	5	0	5.6	8.4	10.1
89264	71.4S	68.9W	780	S	276	0	0	0	1.3	6.6	6.7
89272	75.0S	70.8W	1395	S	255	255	100	0			
89512	70.8S	11.8E	140	MS	115	0	0	0	1.3	-4.3	4.5
89610	65.9S	113.1E	90	S	274	0	0	0	1.6	-7.4	7.6
89614	66.6S	111.2E	500	S	285	285	100	0			
89744	74.0S	43.1E	3353	S	294	0	0	0	0.8	7.4	7.4
89811	66.7S	112.8E	1366	S	277	0	0	1	1.3	-5.2	5.4

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	3074	0	42	1.4	0.3	3039	0	42	0	4.7	0.6
AAL	6734	0	39	1.7	0.3	6542	0	38	0	5.2	0.3
AAR	1470	0	5	1.5	-0.4	1464	0	6	0	7.7	0.3
ACA	2733	1	8	1.6	0.0	2383	0	8	0	6.7	0.5
ACI	63	0	38	2.6	1.5	66	2	38	0	13.7	-0.5
AEA	900	0	3	1.4	0.5	546	0	4	0	6.6	0.7
AEL	248	0	9	1.6	-0.1	216	0	13	0	9.1	0.5
AEW	61	0	5	2.2	-1.1	63	0	13	0	10.1	1.5
AFL	613	1	6	2.2	0.5	491	0	5	0	7.5	1.3
AFR	1500	1	5	1.4	0.1	1215	0	6	0	7.4	0.4
AIS	247	1	8	1.8	-0.4	229	0	9	0	9.6	0.5
AJM	419	0	4	1.4	0.0	370	0	6	0	8.3	0.6
AJX	291	0	2	1.5	0.9	282	0	5	0	6.8	-0.6
AMM	147	1	6	2.0	0.4	123	0	6	0	8.4	1.1
AMT	2077	0	43	1.0	-0.1	2068	0	43	0	4.5	0.1
AMX	330	2	4	1.6	0.3	256	0	4	0	8.1	0.1
ANA	32	0	9	1.9	-0.2	33	0	9	0	7.9	-1.3
ANZ	4012	0	28	1.3	0.0	3987	0	28	0	6.1	0.5
ARG	34	3	29	2.6	0.5	31	0	29	0	14.0	3.5
ATN	65	0	100	4.7	-3.4	63	0	38	0	9.8	3.0
AVA	235	0	3	1.8	1.1	156	1	4	0	8.8	1.3
AVN	135	3	50	1.2	0.2	135	0	49	0	6.2	0.1
AXF	28	0	32	1.0	-0.5	28	0	36	0	7.9	0.3
AZA	490	1	6	1.7	-0.4	443	0	7	0	8.7	0.3
BAF	34	0	0	1.6	-0.7	35	0	0	0	5.2	1.4
BAL	147	1	5	1.1	0.2	135	0	6	0	7.3	0.3
BAW	707	0	6	1.6	-0.2	633	0	7	0	7.4	0.4
BBR	177	1	6	2.1	0.8	119	0	6	0	8.9	2.4
BPA	177	2	10	1.9	-0.1	154	1	10	0	9.4	-0.2
BWA	336	0	4	1.5	0.0	261	0	3	0	5.5	0.3
CAL	57	0	0	1.7	0.1	60	2	3	0	6.3	0.7
CCA	94	3	23	2.2	0.7	97	0	100	0	10.9	-0.3
CES	112	0	9	1.3	0.4	119	1	13	0	9.2	0.6
CFC	33	0	9	1.9	0.4	32	0	19	0	12.2	2.2
CFG	825	0	4	1.7	-0.6	659	0	5	0	6.1	-0.1
CFY	30	0	0	1.4	-0.3	28	0	0	0	4.1	1.5
CGA	145	0	4	1.4	-0.3	127	0	2	0	4.2	1.0
CGF	100	0	4	1.3	-0.5	87	0	2	0	3.6	1.0
CGH	211	0	1	1.1	-0.4	183	0	1	0	3.6	0.7
CKK	81	0	5	1.5	0.2	87	0	9	0	11.0	1.3
CKS	422	0	30	2.2	1.1	422	0	31	0	7.9	0.5
CLX	368	1	5	1.7	-0.4	292	0	5	0	6.7	0.2
COA	196	1	37	1.3	0.2	152	0	34	0	7.8	1.2
CPA	25	0	8	1.4	0.0	27	0	11	0	7.1	-0.2
CRL	557	2	6	1.8	0.4	447	0	4	0	7.1	0.7
CSA	37	0	3	1.7	-0.6	36	0	3	0	6.3	1.3
CSN	49	0	18	2.5	-0.3	50	0	18	0	11.7	1.3
CUB	128	2	4	1.7	0.3	105	0	6	0	10.2	0.5
DAB	412	0	9	1.4	-0.1	381	0	9	0	3.9	0.5
DAI	380	0	2	1.3	0.3	356	0	2	0	4.1	0.9
DAL	2592	0	40	1.3	-0.1	2538	0	41	0	5.6	0.3
DBR	41	0	0	1.7	-0.7	40	0	5	0	8.2	-0.5
DCE	201	0	10	1.4	-0.9	187	0	11	0	6.6	0.1
DCS	23	0	0	1.4	-0.3	23	0	4	0	9.0	1.6
DHL	159	3	100	6.5	-6.2	155	0	100	0	25.2	8.9
DLH	1204	0	16	1.8	-0.4	1073	0	16	0	6.6	0.8
EDW	58	0	5	1.0	0.0	51	0	8	0	8.9	1.5
EEZ	39	0	5	1.5	0.3	38	0	3	0	5.4	0.7
EIA	300	0	26	2.8	1.6	304	2	100	0	18.6	5.5

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS

ELY	190	1	3	1.5	-0.1	176	0	3	0	7.6	0.5
ETH	28	0	14	1.4	0.8	29	7	24	0	8.2	2.1
EVA	89	1	8	1.9	-0.1	96	1	8	0	9.6	-0.2
FDX	2109	0	44	1.4	0.3	2075	0	44	0	7.1	0.3
FGS	161	0	1	1.4	0.1	145	0	1	0	4.4	0.9
FGZ	37	0	3	1.4	-0.6	34	0	3	0	4.1	1.3
FIN	282	1	5	1.7	-0.1	253	0	5	0	7.1	0.7
FJI	888	3	49	1.5	0.5	861	1	49	0	8.9	0.5
FOM	668	0	35	1.4	0.0	659	0	36	0	7.0	0.4
FWQ	57	4	53	0.9	0.2	57	0	51	0	4.6	-0.5
GAF	32	0	3	1.6	-1.1	32	0	6	0	5.6	0.6
GCO	308	0	6	1.5	0.0	316	0	100	0	9.9	1.9
GOJ	68	0	1	1.1	0.1	64	0	2	0	3.6	1.1
GRL	88	0	2	1.4	0.1	77	0	4	0	4.5	0.4
GTI	250	0	17	1.7	0.2	260	0	17	0	8.6	0.4
GVB	52	0	4	1.6	-0.1	46	0	4	0	4.4	1.8
GVF	51	0	2	1.4	-0.6	49	0	2	0	3.9	0.1
GVG	51	0	2	1.1	-0.4	49	0	2	0	3.8	0.7
GVH	52	0	6	1.5	-0.7	47	0	2	0	4.1	0.5
GVL	33	0	0	1.4	0.1	33	0	0	0	4.3	0.9
GVR	133	0	1	1.0	0.0	124	0	0	0	4.2	0.2
GVW	38	0	0	1.3	-0.6	35	0	0	0	3.7	0.7
GVX	30	0	0	1.2	0.0	25	0	0	0	3.9	1.3
GWW	121	0	6	1.1	-0.4	106	0	3	0	3.6	0.8
GYM	24	0	4	1.4	-0.5	24	0	4	0	4.4	1.8
HAL	5257	0	41	1.0	-0.1	5159	0	41	0	5.1	0.2
HRH	121	0	64	1.7	0.0	121	2	63	0	5.4	0.9
IBE	2667	1	4	1.6	0.3	1887	0	5	0	7.2	0.8
ICE	871	0	3	1.6	-0.2	782	0	3	0	6.7	0.8
IWD	275	0	4	1.1	0.0	209	0	3	0	7.0	1.3
JAA	80	1	8	2.1	1.5	79	0	3	0	6.3	2.4
JAL	1978	0	4	1.7	0.4	1909	0	5	0	7.6	0.3
JAZ	998	0	6	1.6	1.1	984	0	6	0	6.5	-0.1
JBU	72	4	6	0.9	0.2	74	0	1	0	6.0	0.3
KAL	2511	1	9	1.7	-0.1	2494	0	9	0	8.1	0.3
KLM	1734	0	6	1.6	-0.1	1446	0	7	0	6.7	0.5
LAN	489	0	4	1.8	-0.3	485	0	4	0	5.7	0.5
LAP	75	0	51	3.0	0.9	70	0	44	0	10.2	1.2
LDI	485	1	4	1.2	-0.4	361	1	6	0	7.4	-0.3
LOT	121	0	4	1.9	-1.3	107	0	5	0	7.2	1.5
LTU	797	1	5	1.5	-0.2	698	0	4	0	6.3	0.7
LXR	39	8	13	1.9	-0.1	29	0	3	0	4.5	0.6
MAS	263	0	8	1.7	0.3	264	0	8	0	7.2	0.5
MON	129	1	5	1.5	0.2	109	0	6	0	7.8	1.0
MPD	269	1	5	1.9	0.2	207	0	3	0	7.1	0.7
MPH	692	0	2	1.8	-0.8	606	0	1	0	6.7	-0.1
MYT	308	0	3	1.6	-0.2	290	0	4	0	6.8	0.1
NAO	384	0	43	1.1	0.1	383	0	44	0	4.8	0.6
NCA	1157	1	5	1.9	0.1	823	0	4	0	6.8	0.1
NWA	8649	1	11	1.7	0.2	8501	0	11	0	7.2	0.2
NZL	3284	0	9	1.4	-0.3	3284	0	9	0	5.4	0.4
OAE	647	1	41	1.4	-0.3	641	0	43	0	7.4	1.6
OOM	38	0	16	3.0	2.7	33	3	15	0	9.3	1.0
PAC	517	0	14	1.6	0.0	526	0	14	0	7.1	0.1
PAL	1336	0	9	1.4	-0.1	1250	0	11	0	8.1	0.3
PAO	347	0	58	1.4	-0.2	344	1	58	0	7.5	0.8
PLM	74	0	4	1.7	1.3	45	0	4	0	6.4	0.2
PUA	28	7	39	2.8	-1.1	26	0	31	0	10.6	2.7
QFA	2439	0	55	1.2	0.3	2431	0	55	0	5.7	0.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
RAM	273	1	5	1.9	0.4	168	1	100	0	10.0	-0.3

RCH	327	0	13	2.7	0.6	271	0	100	0	11.1	1.6
RZO	519	0	4	1.6	-0.4	322	0	5	0	8.3	0.2
SAA	382	0	3	1.4	-0.6	318	0	3	0	7.2	0.2
SEU	112	1	1	1.2	0.1	105	0	1	0	5.6	0.8
SIA	233	0	5	1.4	0.2	234	0	4	0	5.3	0.2
SLR	245	0	9	1.6	-0.1	234	0	11	0	5.7	0.2
SQC	48	0	6	1.3	0.3	48	0	6	0	5.4	1.6
SSV	59	0	5	1.3	-0.1	54	0	4	0	4.6	0.3
TAG	30	0	17	2.5	1.1	26	0	15	0	5.0	0.0
TAM	27	0	22	2.3	0.0	27	0	22	0	10.7	0.4
TAP	522	0	5	1.5	-0.3	236	0	9	0	10.6	0.0
TCX	77	0	5	0.9	0.4	68	0	7	0	7.4	1.7
THA	92	0	3	1.8	0.2	92	0	3	0	5.1	0.2
THT	179	1	29	1.3	0.2	170	0	34	0	9.1	1.2
TPA	28	0	4	1.1	0.5	24	0	8	0	5.9	0.0
TSC	172	1	2	1.7	0.0	123	0	5	0	6.8	0.9
UAL	127776	0	93	1.0	-0.2	127699	0	93	0	5.0	0.4
UPS	2005	0	54	1.5	-0.1	1984	0	54	0	6.7	0.6
USA	96	2	5	1.5	0.3	91	0	5	0	6.1	0.9
VIR	249	2	3	1.6	-0.3	225	1	4	0	7.0	0.4
VRG	127	1	31	2.6	0.4	126	0	100	0	11.5	0.5
VVJ	51	6	37	1.7	-0.2	53	0	28	0	7.9	0.3
VVR	74	0	36	2.6	0.8	74	0	36	0	6.9	0.1
WOA	577	0	7	1.5	0.1	563	0	12	0	9.2	1.1
YSS	82	1	7	1.7	0.8	65	0	8	0	11.0	1.1
9VS	133	0	2	1.2	0.0	123	0	1	0	4.0	0.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AR	1558	1	100	3.0	2.9	1555	0	6	0	5.6	0.6
AU	36640	0	9	1.2	0.4	36640	0	9	0	5.4	0.6
EU	138558	0	22	1.3	0.3	138558	0	22	0	4.5	0.3
KL	4277	2	9	1.3	0.7	4267	0	8	0	8.4	0.8
MK	2244	0	97	1.8	1.5	2234	0	7	0	6.9	0.0
SA	1571	0	4	1.9	1.3	1569	0	4	0	6.5	1.1
TN	20	5	25	1.4	-0.4	20	0	20	0	4.6	1.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
N	2994	1	18	1.7	0.2	2864	0	17	0	5.4	0.9
US ACARS	785504	0	60	1.2	0.4	785494	0	59	0	5.6	0.7

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in $m\ s^{-1}$

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 $m\ s^{-1}$ Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	56	0	27	1.9	-0.7	52	0	29	0	5.0	0.3
AAR	26	0	27	1.5	-0.8	26	0	27	0	4.1	-0.1
ACA	37	3	24	1.3	-0.1	35	3	26	0	5.1	1.3
AFP	25	4	4	2.0	1.3	25	0	0	0	8.1	1.6
AFR	53	4	8	1.2	0.0	43	0	12	0	6.1	-0.2
AMT	30	0	20	2.1	-0.1	30	0	17	0	5.8	1.0
ANZ	233	2	29	1.7	-0.2	236	0	28	0	7.5	-0.2
ATN	53	0	100	3.3	-1.7	51	2	16	0	9.2	2.6
AXF	40	0	63	1.2	-0.3	40	15	68	0	5.3	0.1
BAF	29	3	3	1.1	0.6	27	0	4	0	9.8	0.4
CFC	59	2	10	1.4	0.1	56	0	11	0	7.2	0.2
CKS	76	0	16	2.0	0.5	72	0	17	0	10.5	1.4
DAL	65	0	46	1.2	0.2	63	0	48	0	7.9	1.5
DHL	38	0	100	6.5	-6.4	35	0	100	0	13.9	2.1
DLH	202	1	12	1.6	-0.2	195	0	13	0	6.6	0.0
EIA	35	0	20	2.0	0.3	34	0	100	0	22.2	10.9
FDX	334	1	36	1.4	0.1	342	1	36	0	9.3	0.8
FOM	33	0	42	1.6	-0.4	33	0	42	0	5.8	0.7
GAF	50	2	2	1.3	0.0	46	0	4	0	9.4	0.4
GCO	156	1	7	1.5	0.0	155	0	100	0	11.2	2.2
HAL	92	3	41	1.1	-0.1	92	0	40	0	5.3	0.6
JAL	28	4	4	1.4	0.0	28	4	7	0	7.0	0.3
JAZ	44	0	0	1.9	1.4	41	0	2	0	5.1	-1.0
KAL	88	1	20	1.2	-0.5	90	0	22	0	6.9	0.6
KIW	66	5	45	2.9	0.8	62	0	42	0	8.1	0.3
KLM	38	0	8	2.1	-0.4	34	0	12	0	10.6	-0.2
LAN	25	0	4	1.2	0.3	25	0	4	0	4.3	0.6
MPH	54	0	2	1.5	-0.6	57	0	4	0	9.6	1.1
NCA	80	0	1	1.4	0.4	64	0	0	0	5.0	-1.6
NWA	402	1	12	1.7	0.1	393	0	12	0	7.5	-0.4
NZL	18531	0	53	1.2	0.2	18531	0	53	0	5.2	0.1
PAC	49	0	16	2.1	-0.9	47	0	15	0	9.1	-0.5
PAL	26	0	15	0.9	-0.5	24	0	21	0	5.1	1.7
QFA	294	1	48	1.3	0.2	299	0	48	0	7.0	-0.2
RCH	24	4	38	4.4	-3.3	33	0	100	0	8.8	-0.6
RRR	79	3	23	3.1	1.2	76	0	24	0	11.7	-0.2
SIA	48	0	2	1.1	0.5	49	0	2	0	5.2	1.1
UAL	283857	0	98	1.2	-0.1	283467	0	98	0	4.1	0.4
UPS	101	1	46	1.2	-0.5	106	0	45	0	11.0	0.3
VVR	33	6	36	2.8	-1.1	32	0	28	0	4.6	0.5
WOA	113	1	8	1.6	-0.1	112	0	9	0	8.2	1.8

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AR	846	0	100	2.0	1.6	847	0	45	0	4.8	0.9
AU	32863	0	51	1.1	0.4	32873	0	51	0	4.3	-0.1
EU	522782	0	66	1.1	0.3	519689	0	66	0	3.6	0.0
KL	3080	3	60	1.6	0.5	3074	0	59	0	5.3	0.4
MK	1258	0	100	1.4	0.8	1245	0	52	0	4.5	0.7
SA	1015	0	56	1.7	0.9	1015	0	56	0	3.9	0.3

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
N	35	11	20	2.0	-1.4	40	0	20	0	9.2	1.1
US ACARS	1542901	0	78	1.2	0.2	1537147	0	78	0	4.1	0.4

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 39453

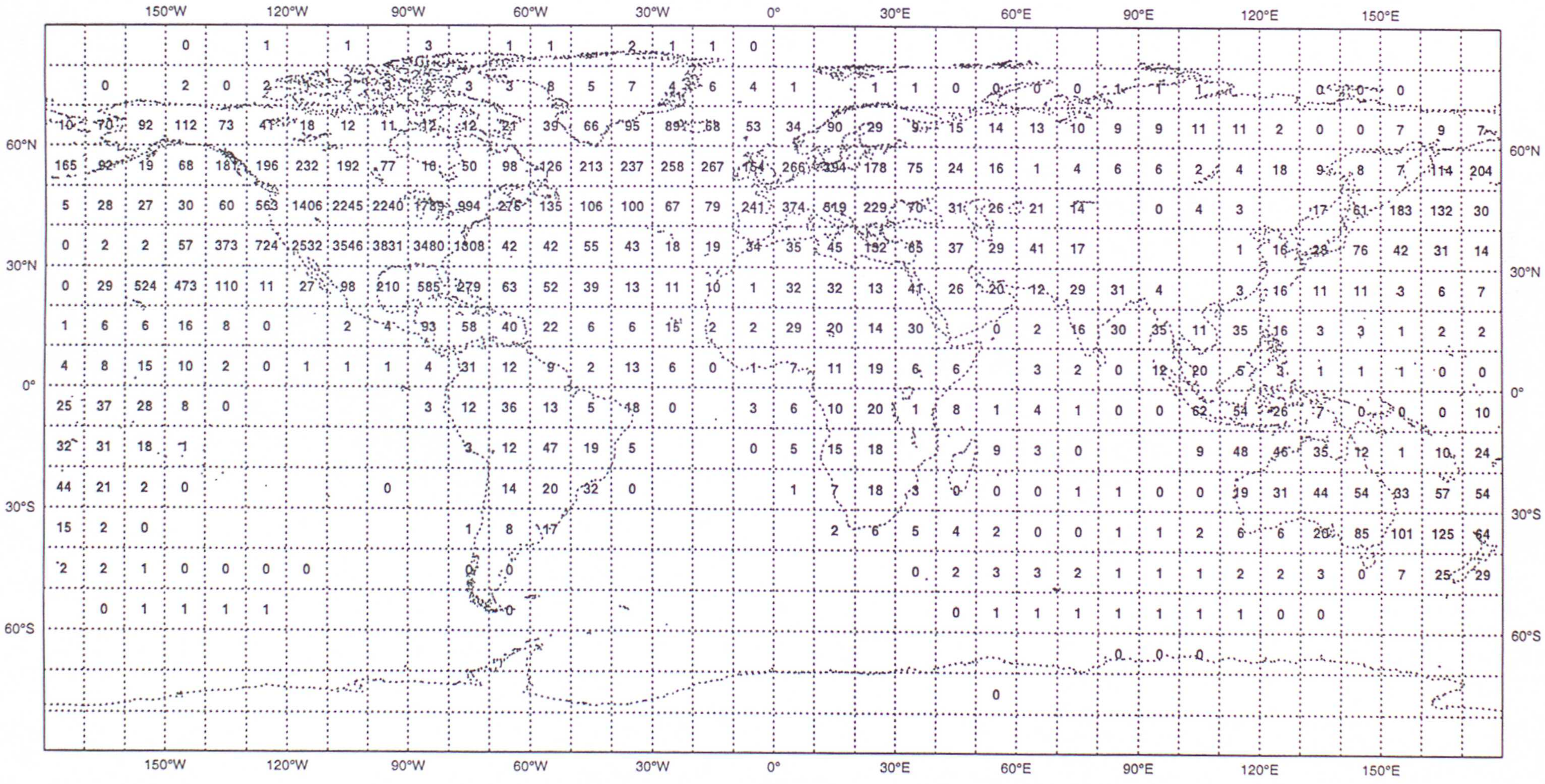

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 1 1 3 1 1 2 1 1 0
0 2 0 2 3 3 3 8 5 7 4 6 4 1 1 1 0 0 0 0 1 1 1 0 0 0
10 70 92 112 73 41 18 12 11 12 12 21 39 66 95 89 68 53 34 90 29 9 15 14 13 10 9 9 11 11 2 0 0 7 9 7
165 92 19 68 181 196 232 192 77 16 50 98 126 213 237 258 267 164 266 394 178 75 24 16 1 4 6 6 2 4 18 9 8 7 114 204
5 28 27 30 60 563 1406 2245 2240 1789 994 276 135 106 100 67 79 241 374 519 229 70 31 26 21 14 0 4 3 17 61 183 132 30
0 2 2 57 373 724 2532 3546 3831 3480 1308 42 42 55 43 18 19 34 35 45 132 65 37 29 41 17 1 16 28 76 42 31 14
0 29 524 473 110 11 27 98 210 585 279 63 52 39 13 11 10 1 32 32 13 41 26 20 12 29 31 4 3 16 11 11 3 6 7
1 6 6 16 8 0 2 4 93 58 40 22 6 6 15 2 2 29 20 14 30 0 2 16 30 35 11 35 16 3 3 1 2 2
4 8 15 10 2 0 1 1 1 4 31 12 9 2 13 6 0 1 7 11 19 6 6 3 2 0 12 20 5 3 1 1 1 0 0
25 37 28 8 0 3 12 36 13 5 48 0 3 6 10 20 1 8 1 4 1 0 0 62 54 26 7 0 0 0 10
32 31 18 1 3 12 47 19 5 0 5 15 18 9 3 0 9 48 46 35 12 1 10 24
44 21 2 0 0 14 20 32 0 1 7 18 3 0 0 0 1 1 0 0 19 31 44 54 33 57 54
15 2 0 1 8 17 2 6 5 4 2 0 0 1 1 2 6 6 26 85 101 125 64
2 2 1 0 0 0 0 0 0 0 2 3 3 2 1 1 1 2 2 3 0 7 25 29
0 1 1 1 1 0 0 1 1 1 1 1 1 1 0 0
0 0 0
0

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 80053

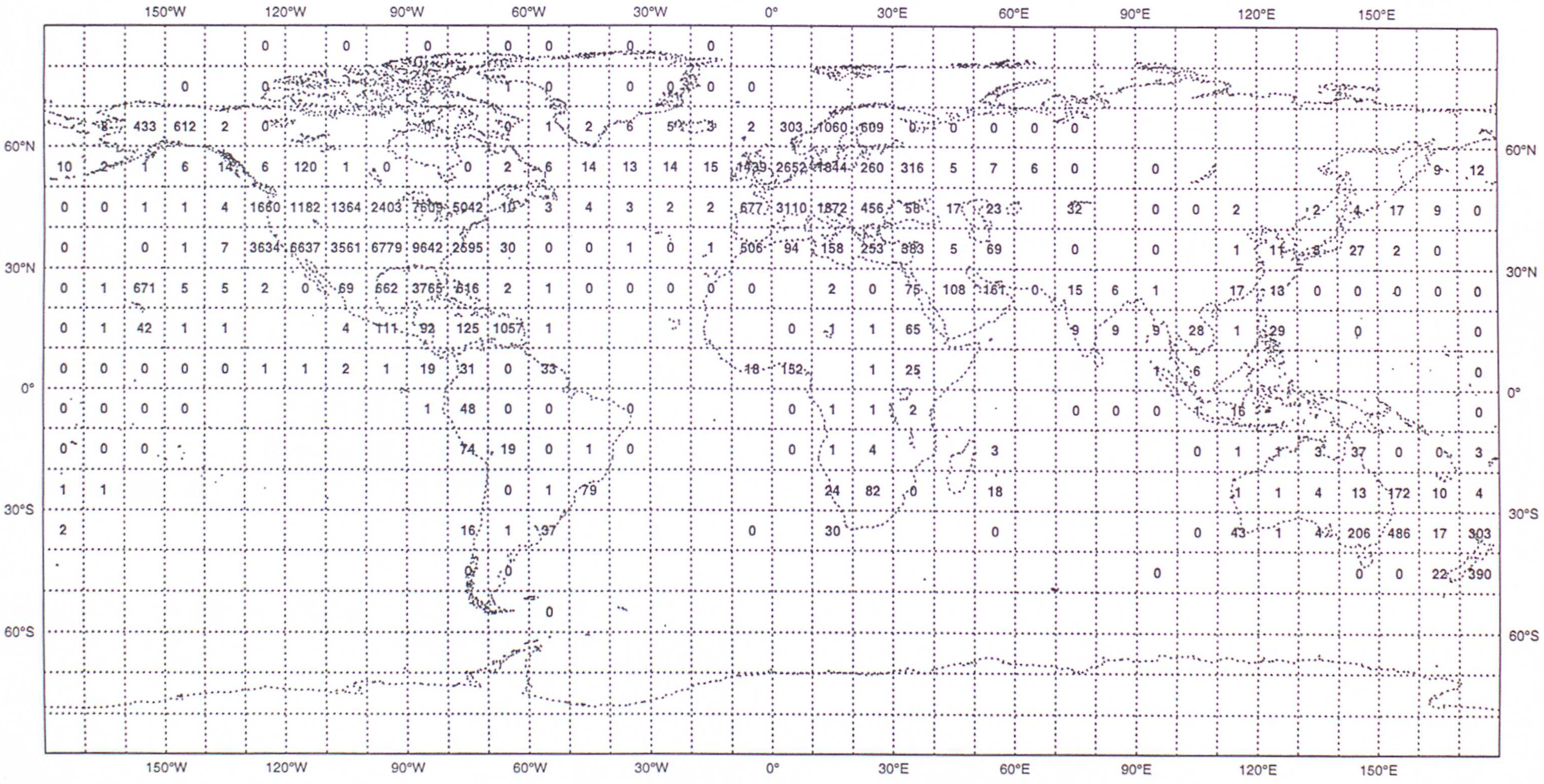

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

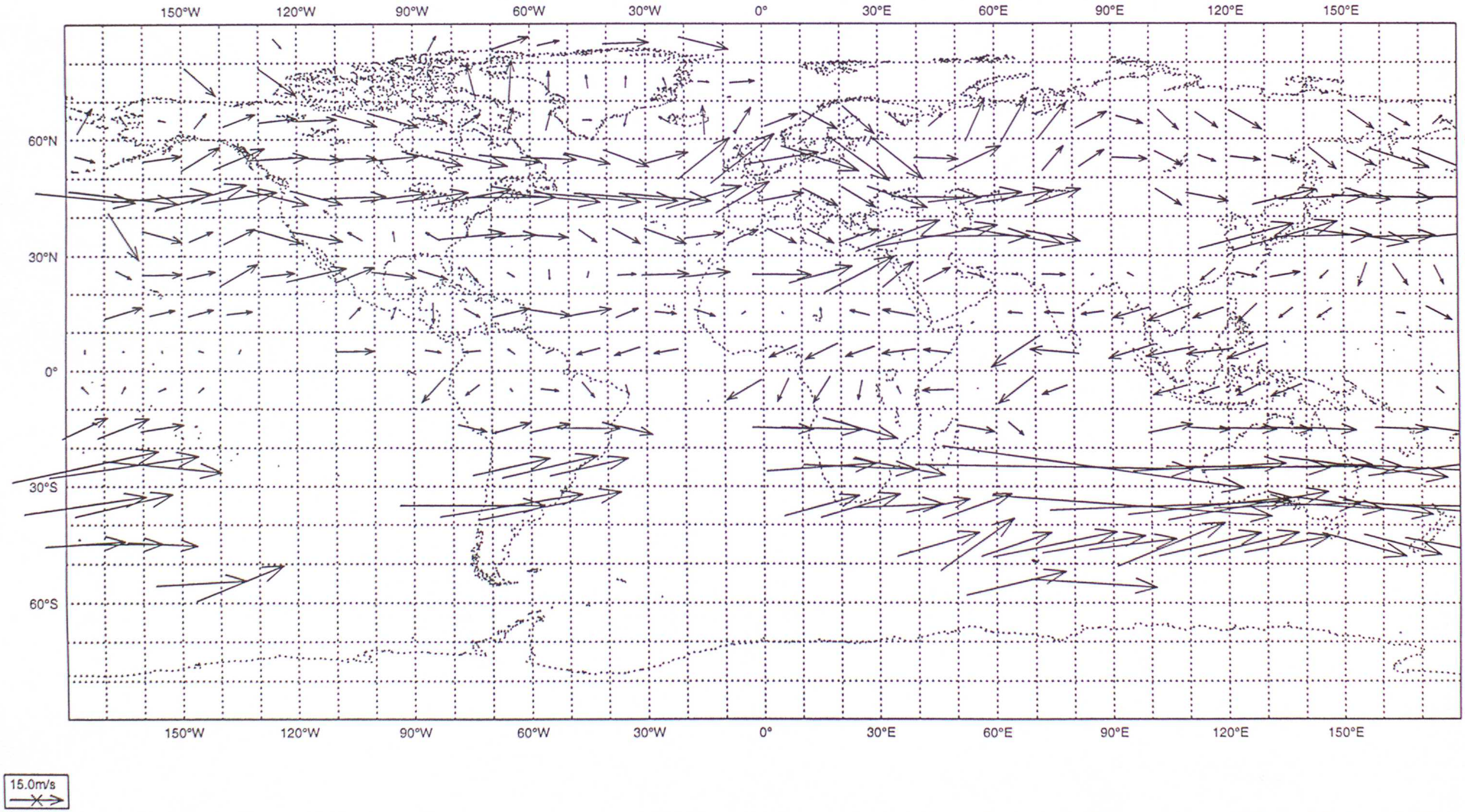

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

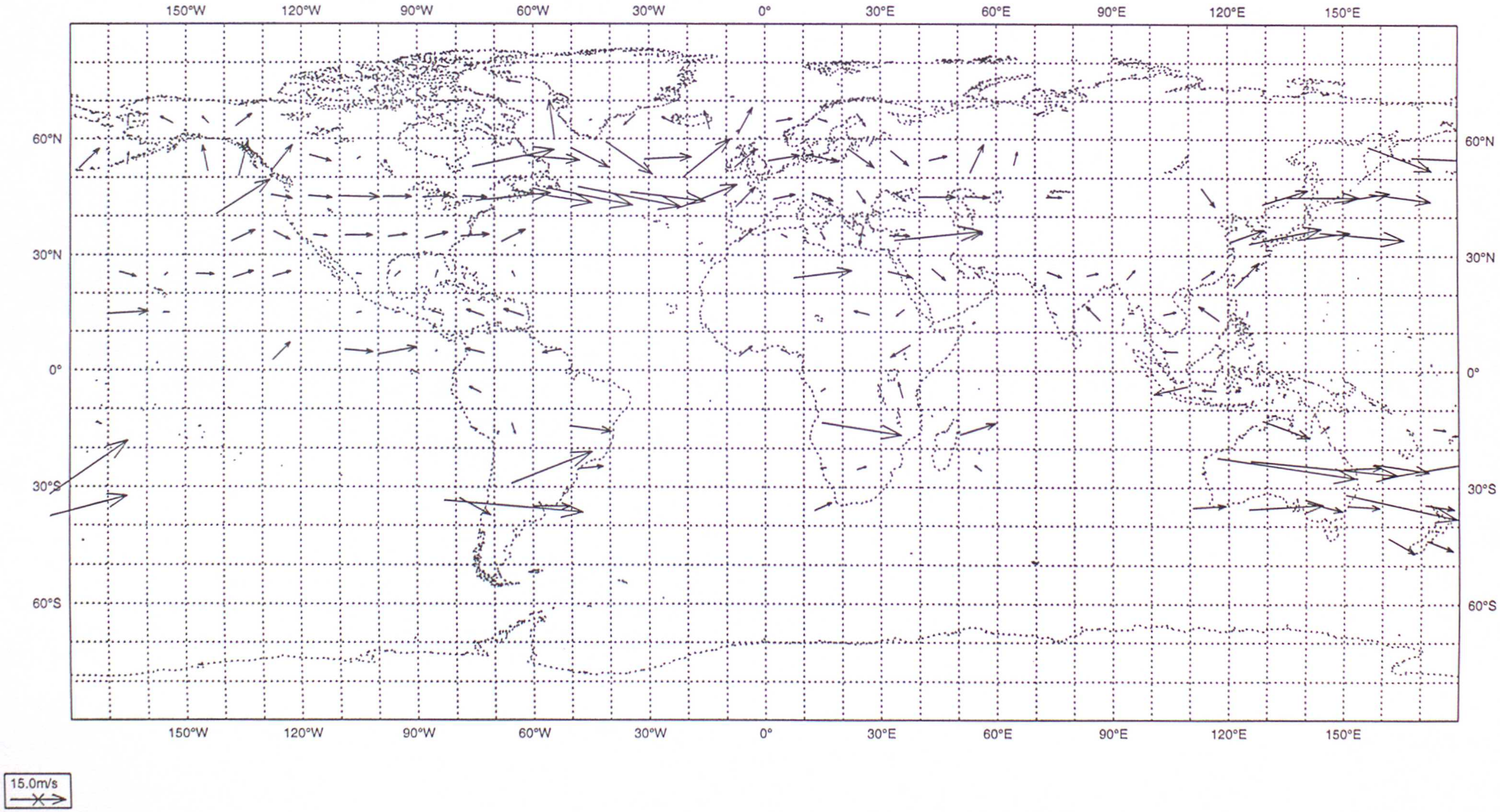

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

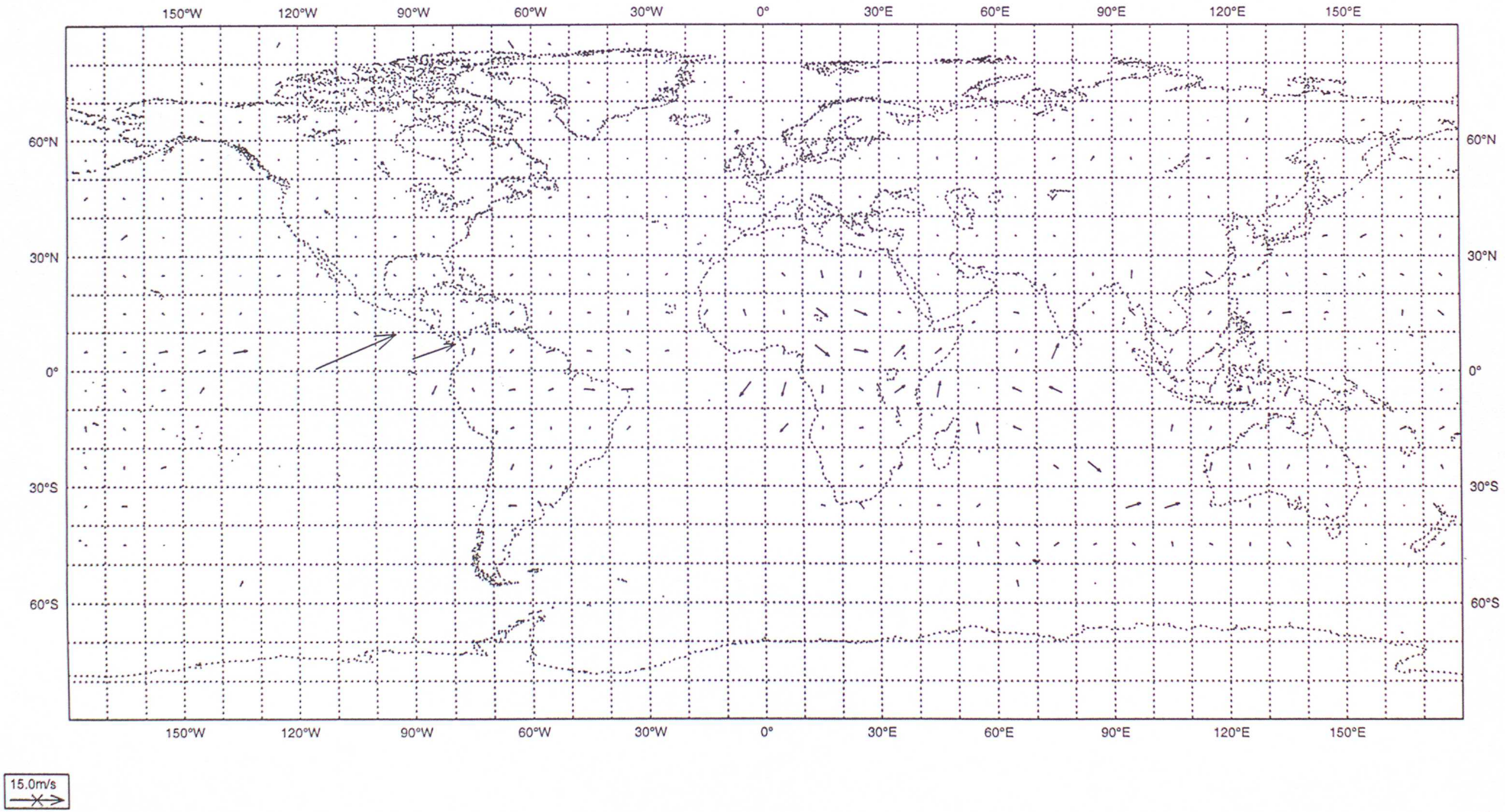

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

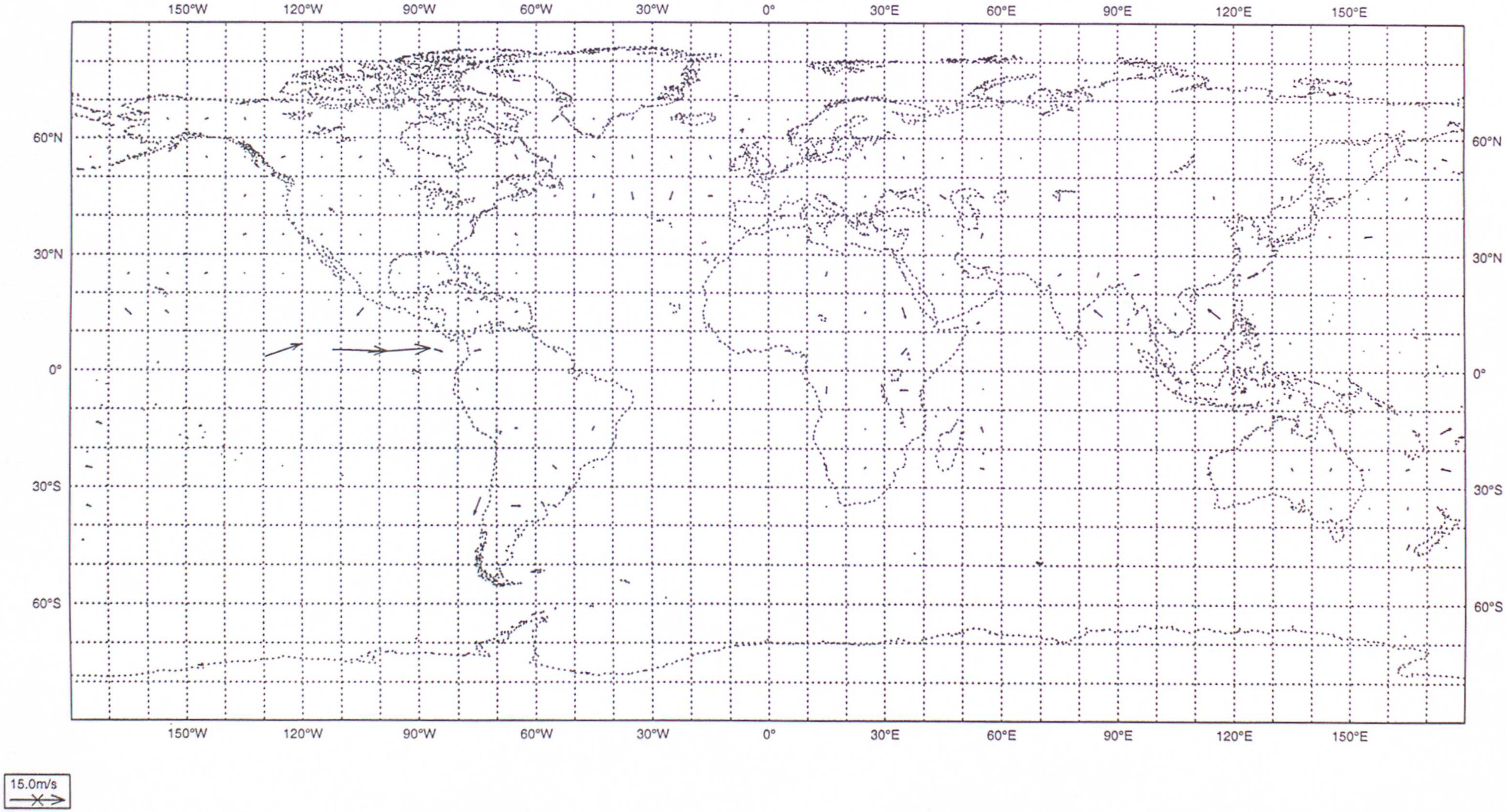

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

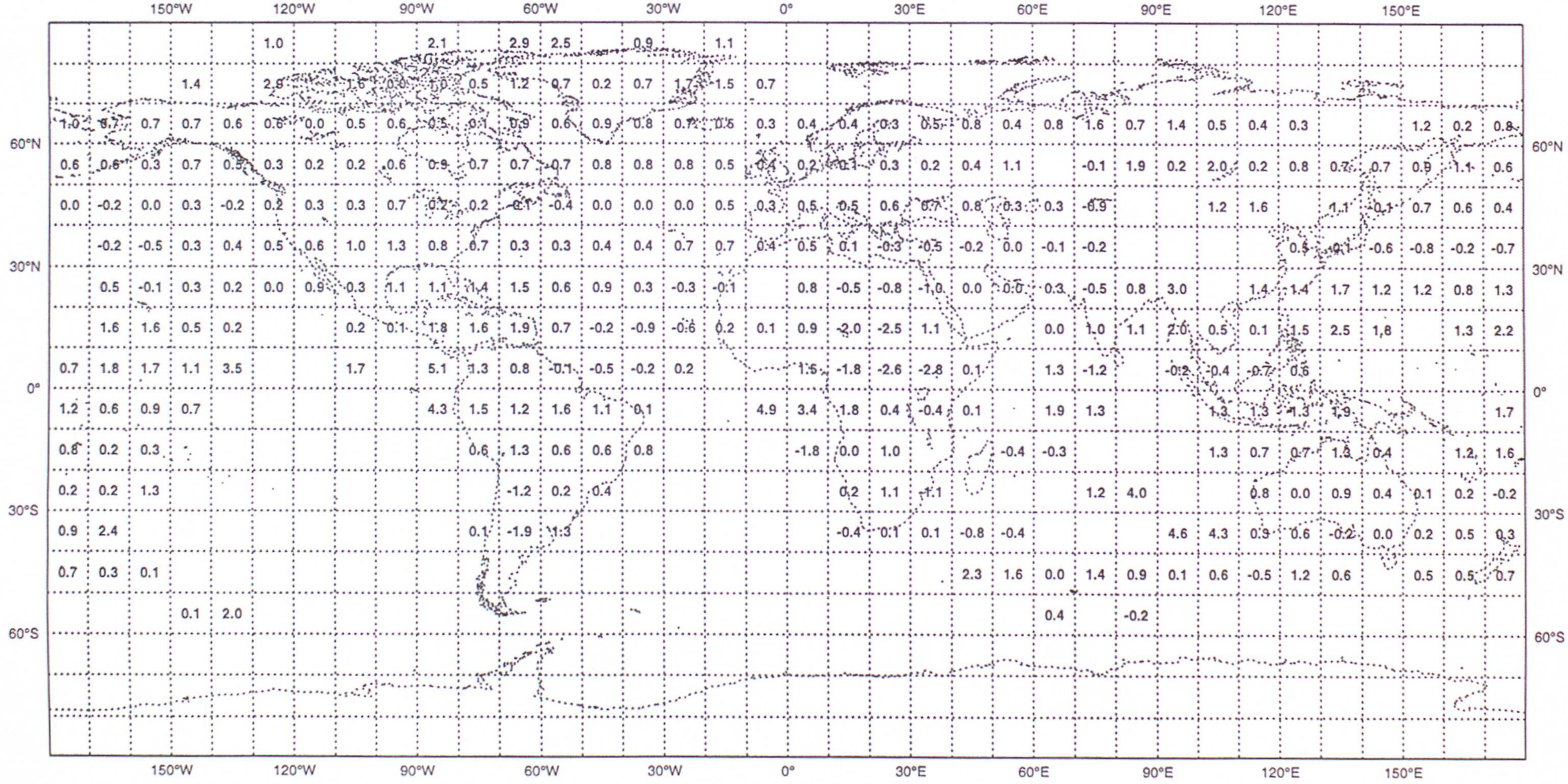
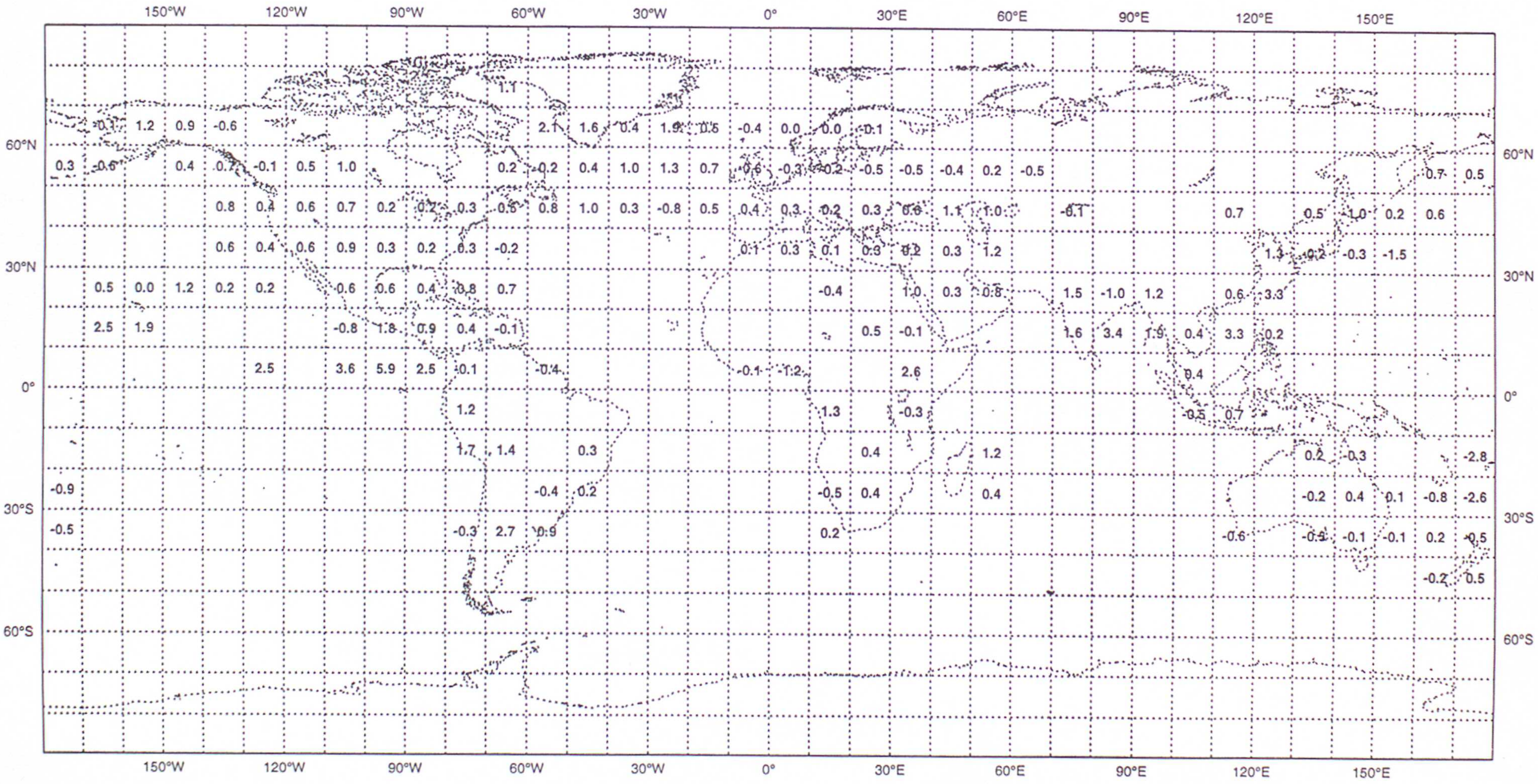

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
1.0 2.1 2.9 2.5 0.9 1.1
1.4 2.9 1.6 0.0 1.0 0.5 1.2 0.7 0.2 0.7 1.7 1.5 0.7
1.0 0.7 0.7 0.7 0.6 0.6 0.0 0.5 0.6 0.5 0.1 0.9 0.6 0.9 0.8 0.7 0.6 0.3 0.4 0.4 0.3 0.5 0.8 0.4 0.8 1.6 0.7 1.4 0.5 0.4 0.3 1.2 0.2 0.8
0.6 0.6 0.3 0.7 0.5 0.3 0.2 0.2 0.6 0.9 0.7 0.7 0.7 0.8 0.8 0.8 0.5 0.4 0.2 0.1 0.3 0.2 0.4 1.1 -0.1 1.9 0.2 2.0 0.2 0.8 0.7 0.7 0.9 1.1 0.6
0.0 -0.2 0.0 0.3 -0.2 0.2 0.3 0.3 0.7 0.2 0.2 -0.1 -0.4 0.0 0.0 0.0 0.5 0.3 0.5 0.5 0.6 0.7 0.8 0.3 0.3 -0.9 1.2 1.6 1.1 -0.1 0.7 0.6 0.4
-0.2 -0.5 0.3 0.4 0.5 0.6 1.0 1.3 0.8 0.7 0.3 0.3 0.4 0.4 0.7 0.7 0.4 0.5 0.1 -0.3 -0.5 -0.2 0.0 -0.1 -0.2 0.5 -0.1 -0.6 -0.8 -0.2 -0.7
0.5 -0.1 0.3 0.2 0.0 0.9 -0.3 1.1 1.1 1.4 1.5 0.6 0.9 0.3 -0.3 -0.1 0.8 -0.5 -0.8 -1.0 0.0 0.0 0.3 -0.5 0.8 3.0 1.4 1.4 1.7 1.2 1.2 0.8 1.3
1.6 1.6 0.5 0.2 0.2 0.1 1.8 1.6 1.9 0.7 -0.2 -0.9 -0.6 0.2 0.1 0.9 -2.0 -2.5 1.1 0.0 1.0 1.1 2.0 0.5 0.1 1.5 2.5 1.8 1.3 2.2
0.7 1.8 1.7 1.1 3.5 1.7 5.1 1.3 0.8 -0.1 -0.5 -0.2 0.2 1.5 -1.8 -2.6 -2.8 0.1 1.3 -1.2 -0.2 -0.4 -0.7 0.6
1.2 0.6 0.9 0.7 4.3 1.5 1.2 1.6 1.1 0.1 4.9 3.4 1.8 0.4 -0.4 0.1 1.9 1.3 1.3 1.3 -1.3 1.9 1.7
0.8 0.2 0.3 0.6 1.3 0.6 0.6 0.8 -1.8 0.0 1.0 -0.4 -0.3 1.3 0.7 0.7 1.3 0.4 1.2 1.6
0.2 0.2 1.3 -1.2 0.2 0.4 0.2 1.1 1.1 1.2 4.0 0.8 0.0 0.9 0.4 0.1 0.2 -0.2
0.9 2.4 0.1 -1.9 1.3 -0.4 0.1 0.1 -0.8 -0.4 4.6 4.3 0.9 0.6 -0.2 0.0 0.2 0.5 0.3
0.7 0.3 0.1 2.3 1.6 0.0 1.4 0.9 0.1 0.6 -0.5 1.2 0.6 0.5 0.5 0.7
0.1 2.0 0.4 -0.2

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present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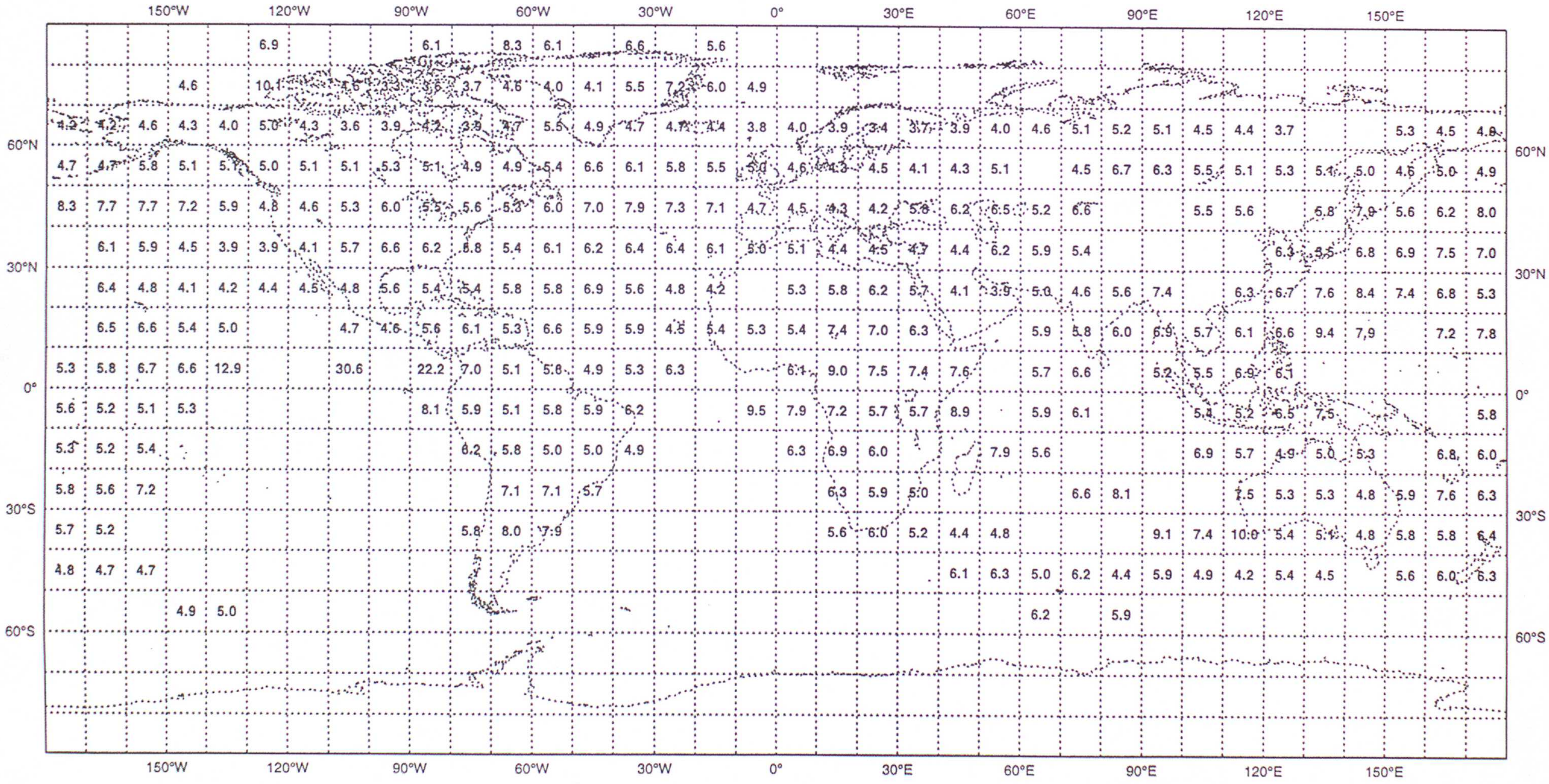
60°N 30°N 0° 30°S 60°S
1.1
-0.1 1.2 0.9 -0.6 2.1 1.6 0.4 1.9 0.5 -0.4 0.0 0.0 -0.1
0.3 -0.6 0.4 0.7 -0.1 0.5 1.0 0.2 -0.2 0.4 1.0 1.3 0.7 -0.6 -0.3 -0.2 -0.5 -0.5 -0.4 0.2 -0.5 0.7 0.5
0.8 0.4 0.6 0.7 0.2 0.2 0.3 -0.5 0.8 1.0 0.3 -0.8 0.5 0.4 0.3 0.2 0.3 0.6 1.1 1.0 -0.1 0.7 0.5 -1.0 0.2 0.6
0.6 0.4 0.6 0.9 0.3 0.2 0.3 -0.2 0.1 0.3 0.1 0.3 0.2 0.3 1.2 1.3 -0.2 -0.3 -1.5
0.5 0.0 1.2 0.2 0.2 0.6 0.6 0.4 0.8 0.7 -0.4 1.0 0.3 0.8 1.5 -1.0 1.2 0.6 3.3
2.5 1.9 -0.8 1.8 0.9 0.4 -0.1 0.5 -0.1 1.6 3.4 1.9 0.4 3.3 0.2
2.5 3.6 5.9 2.5 0.1 -0.4 -0.1 -1.2 2.6 0.4
1.2 1.3 -0.3 -0.5 0.7
1.7 1.4 0.3 0.4 1.2 0.2 -0.3 -2.8
-0.9 -0.4 0.2 -0.5 0.4 0.4 -0.2 0.4 0.1 -0.8 -2.6
-0.5 -0.3 2.7 0.9 0.2 -0.6 -0.5 -0.1 -0.1 0.2 -0.5
-0.2 0.5

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present


150°W
120°W
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60°W
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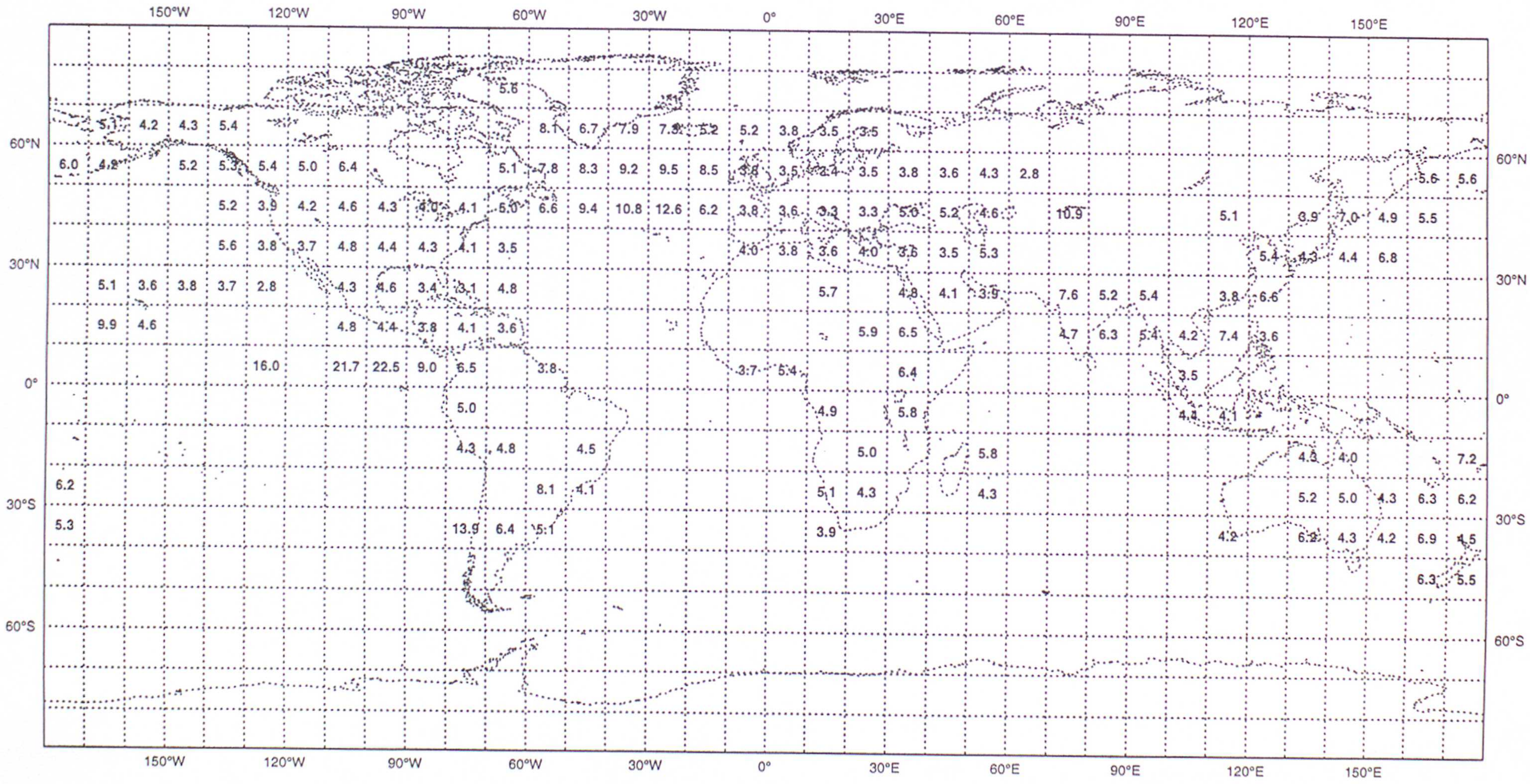
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
6.9 6.1 8.3 6.1 6.6 5.6
4.6 10.1 4.6 3.3 3.6 3.7 4.6 4.0 4.1 5.5 7.2 6.0 4.9
4.2 4.2 4.6 4.3 4.0 5.0 4.3 3.6 3.9 4.2 3.9 4.7 5.5 4.9 4.7 4.7 4.4 3.8 4.0 3.9 3.4 3.7 3.9 4.0 4.6 5.1 5.2 5.1 4.5 4.4 3.7 5.3 4.5 4.8
4.7 4.7 5.8 5.1 5.1 5.0 5.1 5.1 5.3 5.1 4.9 4.9 5.4 6.6 6.1 5.8 5.5 5.0 4.6 4.3 4.5 4.1 4.3 5.1 4.5 6.7 6.3 5.5 5.1 5.3 5.1 5.0 4.6 5.0 4.9
8.3 7.7 7.7 7.2 5.9 4.8 4.6 5.3 6.0 5.5 5.6 5.3 6.0 7.0 7.9 7.3 7.1 4.7 4.5 4.3 4.2 5.8 6.2 6.5 5.2 6.6 5.5 5.6 5.8 7.9 5.6 6.2 8.0
6.1 5.9 4.5 3.9 3.9 4.1 5.7 6.6 6.2 5.8 5.4 6.1 6.2 6.4 6.4 6.1 5.0 5.1 4.4 4.5 4.7 4.4 6.2 5.9 5.4 6.3 5.5 6.8 6.9 7.5 7.0
6.4 4.8 4.1 4.2 4.4 4.5 4.8 5.6 5.4 5.4 5.8 5.8 6.9 5.6 4.8 4.2 5.3 5.8 6.2 5.7 4.1 3.9 5.0 4.6 5.6 7.4 6.3 6.7 7.6 8.4 7.4 6.8 5.3
6.5 6.6 5.4 5.0 4.7 4.6 5.6 6.1 5.3 6.6 5.9 5.9 4.5 5.4 5.3 5.4 7.4 7.0 6.3 5.9 5.8 6.0 6.9 5.7 6.1 6.6 9.4 7.9 7.2 7.8
5.3 5.8 6.7 6.6 12.9 30.6 22.2 7.0 5.1 5.8 4.9 5.3 6.3 6.1 9.0 7.5 7.4 7.6 5.7 6.6 5.2 5.5 6.9 6.1
5.6 5.2 5.1 5.3 8.1 5.9 5.1 5.8 5.9 6.2 9.5 7.9 7.2 5.7 5.7 8.9 5.9 6.1 5.4 5.2 6.5 7.5 5.8
5.3 5.2 5.4 6.2 5.8 5.0 5.0 4.9 6.3 6.9 6.0 7.9 5.6 6.9 5.7 4.9 5.0 5.3 6.8 6.0
5.8 5.6 7.2 7.1 7.1 5.7 6.3 5.9 5.0 6.6 8.1 7.5 5.3 5.3 4.8 5.9 7.6 6.3
5.7 5.2 5.8 8.0 7.9 5.6 6.0 5.2 4.4 4.8 9.1 7.4 10.0 5.4 5.1 4.8 5.8 5.8 6.4
4.8 4.7 4.7 6.1 6.3 5.0 6.2 4.4 5.9 4.9 4.2 5.4 4.5 5.6 6.0 6.3
4.9 5.0 6.2 5.9

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). JUNE 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present


150°W
120°W
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60°W
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0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
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30°S
60°S
5.6
5.1 4.2 4.3 5.4 8.1 6.7 7.9 7.8 5.2 5.2 3.8 3.5 3.5
6.0 4.2 5.2 5.3 5.4 5.0 6.4 5.1 7.8 8.3 9.2 9.5 8.5 3.8 3.5 2.4 3.5 3.8 3.6 4.3 2.8 5.6 5.6
5.2 3.9 4.2 4.6 4.3 4.0 4.1 5.0 6.6 9.4 10.8 12.6 6.2 3.8 3.6 3.3 3.3 5.0 5.2 4.6 10.9 5.1 3.9 7.0 4.9 5.5
5.6 3.8 3.7 4.8 4.4 4.3 4.1 3.5 4.0 3.8 3.6 4.0 3.6 3.5 5.3 5.4 4.3 4.4 6.8
5.1 3.6 3.8 3.7 2.8 4.3 4.6 3.4 3.1 4.8 5.7 4.8 4.1 3.9 7.6 5.2 5.4 3.8 6.6
9.9 4.6 4.8 4.4 3.8 4.1 3.6 5.9 6.5 4.7 6.3 5.4 4.2 7.4 3.6
16.0 21.7 22.5 9.0 6.5 3.8 3.7 5.4 6.4 3.5
5.0 4.9 5.8 4.4 4.1
4.3 4.8 4.5 5.0 5.8 4.3 4.0 7.2
6.2 8.1 4.1 5.1 4.3 4.3 5.2 5.0 4.3 6.3 6.2
5.3 13.9 6.4 5.1 3.9 4.2 6.2 4.3 4.2 6.9 4.5
6.3 5.5

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

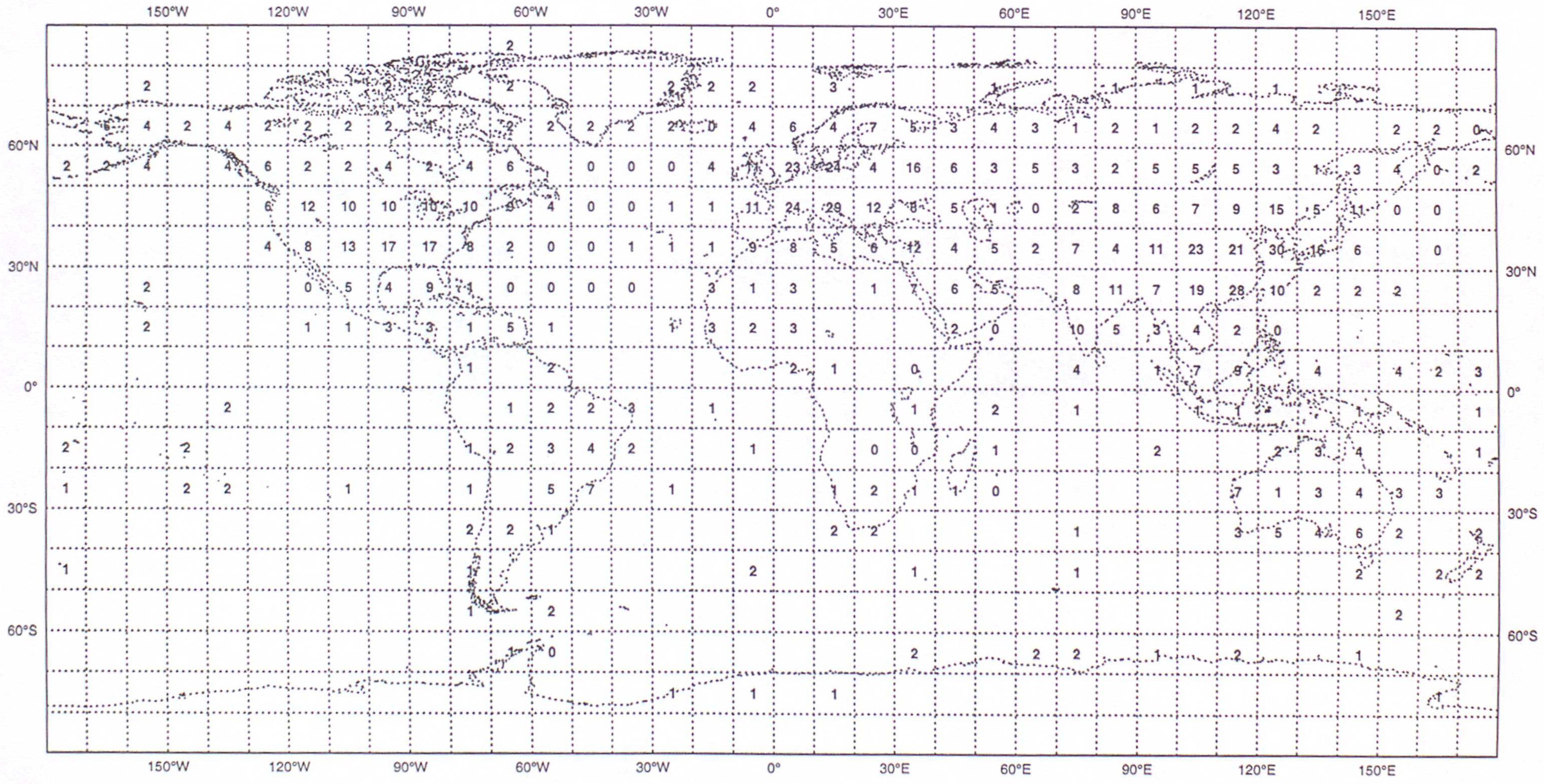
Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
20674	12	Z	70	73/ 80	19	0	66.0	214.1	224.0	7
33317	00	Z	200	50/ 27	22	0	42.5	76.3	87.3	4
42101	00	Z	200	30/ 76	26	0	84.9	-33.9	91.5	7
42339	00	Z	100	26/ 73	11	0	134.3	44.2	141.4	6
42339	12	Z	500	26/ 73	21	0	53.6	1.5	53.6	4
42361	00	Z	150	26/ 78	10	0	113.0	-72.5	134.2	4
42361	12	Z	200	26/ 78	12	0	139.7	-1.4	139.7	7
42369	00	Z	150	27/ 81	19	1	108.3	93.7	143.2	9
42369	12	Z	250	27/ 81	17	1	79.2	46.4	91.8	11
42379	00	Z	300	27/ 83	17	0	43.0	-71.4	83.3	7
42379	12	Z	1000	27/ 83	11	0	12.7	-51.4	52.9	4
42397	12	Z	400	27/ 88	17	0	56.4	-37.2	67.6	5
42492	00	Z	1000	26/ 85	14	10	8.4	-87.1	87.5	8
42492	12	Z	1000	26/ 85	7	17	5.1	-92.3	92.4	5
42647	12	Z	1000	23/ 73	14	6	10.6	-80.6	81.3	9
42701	12	Z	500	23/ 85	16	0	40.3	-34.1	52.8	6
42724	12	Z	200	24/ 91	19	0	50.6	-66.3	83.4	5
42809	00	Z	1000	23/ 88	27	0	19.6	-36.9	41.8	8
42867	00	Z	150	21/ 79	16	0	122.9	4.3	123.0	7
42867	12	Z	100	21/ 79	8	2	165.1	81.1	183.9	7
42874	12	Z	200	21/ 82	18	0	92.4	82.2	123.7	6
42971	00	Z	1000	20/ 86	25	0	14.5	-70.5	71.9	4
42971	12	Z	1000	20/ 86	15	5	9.2	-82.6	83.1	6
43003	00	Z	1000	19/ 73	2	25	1.5	-98.5	98.5	4
43003	12	Z	100	19/ 73	9	3	56.3	199.0	206.8	7
43185	00	Z	50	16/ 81	11	0	110.6	147.7	184.5	4
43192	12	Z	100	15/ 74	10	0	103.9	101.1	144.9	7
43279	12	Z	1000	13/ 80	14	0	15.2	-68.5	70.2	4
43285	00	Z	100	13/ 75	13	0	96.5	-98.8	138.1	7
43311	00	Z	200	11/ 73	18	0	61.7	-70.6	93.7	4
43346	00	Z	50	11/ 80	19	1	110.9	98.5	148.4	7
43346	12	Z	50	11/ 80	13	0	112.8	209.9	238.3	10
43369	12	Z	150	8/ 73	20	0	72.7	132.3	150.9	7
43371	00	Z	100	8/ 77	25	0	129.5	-82.0	153.3	9
43371	12	Z	50	8/ 77	17	0	111.0	128.9	170.1	6
82599	00	Z	500	-6/ -35	2	0	61.0	-64.0	88.4	5
97180	00	Z	200	-5/ 120	12	0	66.2	-65.9	93.4	6

Figure 8. TEMP 500 hPa geopotential mean daily count. JUNE 2003
All hours
Global average number of observations in 24 hours = 1134


150°W
120°W
90°W
60°W
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60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
40809	12	V	300	33/ 59	12	0	100	-2.6	-3.2	16.6	1
40948	00	V	250	35/ 69	29	0	0	-0.8	13.7	15.2	1
40948	12	V	250	35/ 69	23	0	0	0.1	14.5	16.5	3
42647	12	V	250	23/ 73	10	0	100	3.9	3.3	18.0	1
48455	12	V	100	14/ 101	17	0	100	11.5	6.6	16.0	1
48698	00	V	100	1/ 104	29	0	24	4.1	-2.7	16.5	1
52323	00	V	300	42/ 97	30	0	3	1.8	0.8	15.4	1
60360	12	V	100	37/ 8	16	0	100	8.6	-5.7	16.1	1
60566	12	V	200	32/ 4	10	0	100	-11.3	6.4	19.4	3
63741	00	V	100	-1/ 37	28	0	50	21.8	0.3	27.2	1
63985	00	V	100	-5/ 55	29	0	58	20.2	6.4	26.9	1
63985	12	V	100	-5/ 55	23	0	56	18.4	7.6	26.5	1
64458	12	V	100	2/ 16	13	0	92	14.9	-0.4	21.2	1
64500	12	V	100	0/ 9	15	0	100	12.6	-1.7	16.1	1
68263	12	V	200	-26/ 28	11	0	54	-19.3	4.0	24.1	2
68442	12	V	250	-29/ 26	18	0	100	-19.8	0.4	25.5	3
68461	12	V	200	-28/ 28	17	0	100	-16.9	3.7	19.4	3
68512	12	V	200	-30/ 18	21	0	100	-15.7	1.6	20.3	2
68588	12	V	400	-30/ 31	10	0	10	5.1	-0.4	15.9	1
87623	12	V	150	-37/ -64	26	0	3	-3.9	1.6	20.6	1

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. JUNE 2003
All hours
Global average number of observations in 24 hours = 1327

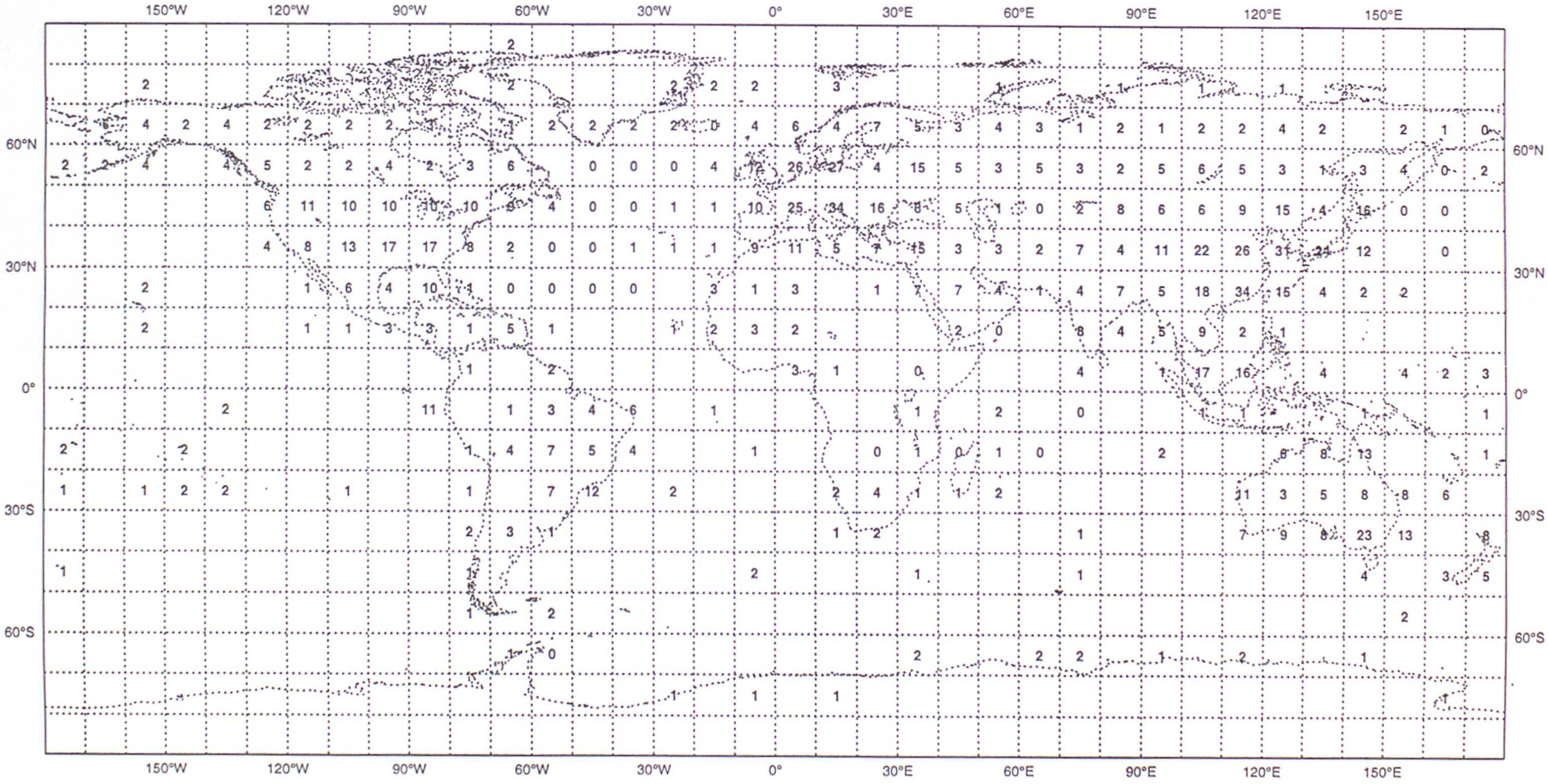

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa
Element monitored	:WIND DIRECTION in degrees

Parameters monitored

:NUM OBS	:Average number of observations at all levels.
:BIAS	:Mean difference of observations from background values from all levels.
:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
08594	12	DD	17/ -23	12	-13.6	9.3	17.1
33317	00	DD	50/ 27	22	-12.8	2.0	7.3
33791	12	DD	48/ 33	24	-11.2	2.7	12.5
40948	00	DD	35/ 69	28	-25.7	9.9	14.1
40948	12	DD	35/ 69	22	-26.1	9.7	15.0
43333	00	DD	12/ 93	18	17.6	8.8	16.9
48327	00	DD	19/ 99	15	13.5	9.6	25.3
55299	12	DD	31/ 92	21	-11.0	3.4	16.8
59758	12	DD	20/ 110	13	16.0	3.2	19.7
62337	00	DD	31/ 34	26	-16.9	4.9	9.7
91408	12	DD	7/ 134	16	11.9	9.4	27.4

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

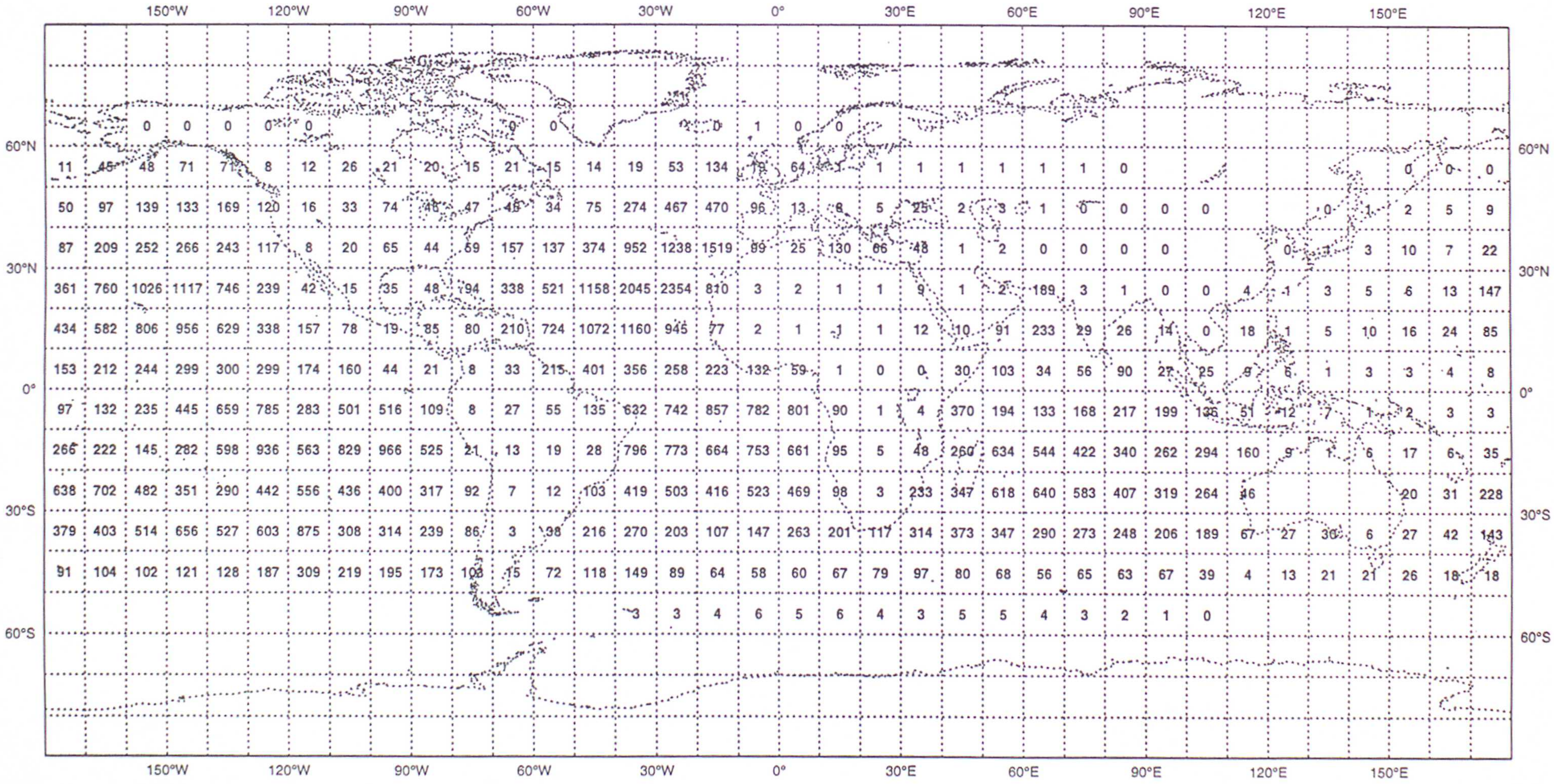
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. JUNE 2003
Global average number of observations in 24 hours = 79187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60°N 30°N 0° 30°S 60°S
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11 45 48 71 71 8 12 26 21 20 15 21 15 14 19 53 134 19 64 1 1 1 1 1 1 1 0 0 0 0
50 97 139 133 169 120 16 33 74 46 47 45 34 75 274 467 470 96 13 8 5 25 2 3 1 0 0 0 0 0 1 2 5 9
87 209 252 266 243 117 8 20 65 44 69 157 137 374 952 1238 1519 89 25 130 66 48 1 2 0 0 0 0 0 1 3 10 7 22
361 760 1026 1117 746 239 42 15 35 48 94 338 521 1158 2045 2354 810 3 2 1 1 9 1 2 189 3 1 0 0 4 1 3 5 6 13 147
434 582 806 956 629 338 157 78 19 85 80 210 724 1072 1160 945 77 2 1 1 1 12 10 91 233 29 26 14 0 18 1 5 10 16 24 85
153 212 244 299 300 299 174 160 44 21 8 33 215 401 356 258 223 132 59 1 0 0 30 103 34 56 90 27 25 9 6 1 3 3 4 8
97 132 235 445 659 785 283 501 516 109 8 27 55 135 632 742 857 782 801 90 1 4 370 194 133 168 217 199 136 51 12 7 1 2 3 3
266 222 145 282 598 936 563 829 966 525 21 13 19 28 796 773 664 753 661 95 5 48 260 634 544 422 340 262 294 160 9 1 6 17 6 35
638 702 482 351 290 442 556 436 400 317 92 7 12 103 419 503 416 523 469 98 3 233 347 618 640 583 407 319 264 46 20 31 228
379 403 514 656 527 603 875 308 314 239 86 3 38 216 270 203 107 147 263 201 117 314 373 347 290 273 248 206 189 67 27 30 6 27 42 143
91 104 102 121 128 187 309 219 195 173 103 15 72 118 149 89 64 58 60 67 79 97 80 68 56 65 63 67 39 4 13 21 21 26 18 18
3 3 4 6 5 6 4 3 5 5 4 3 2 1 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

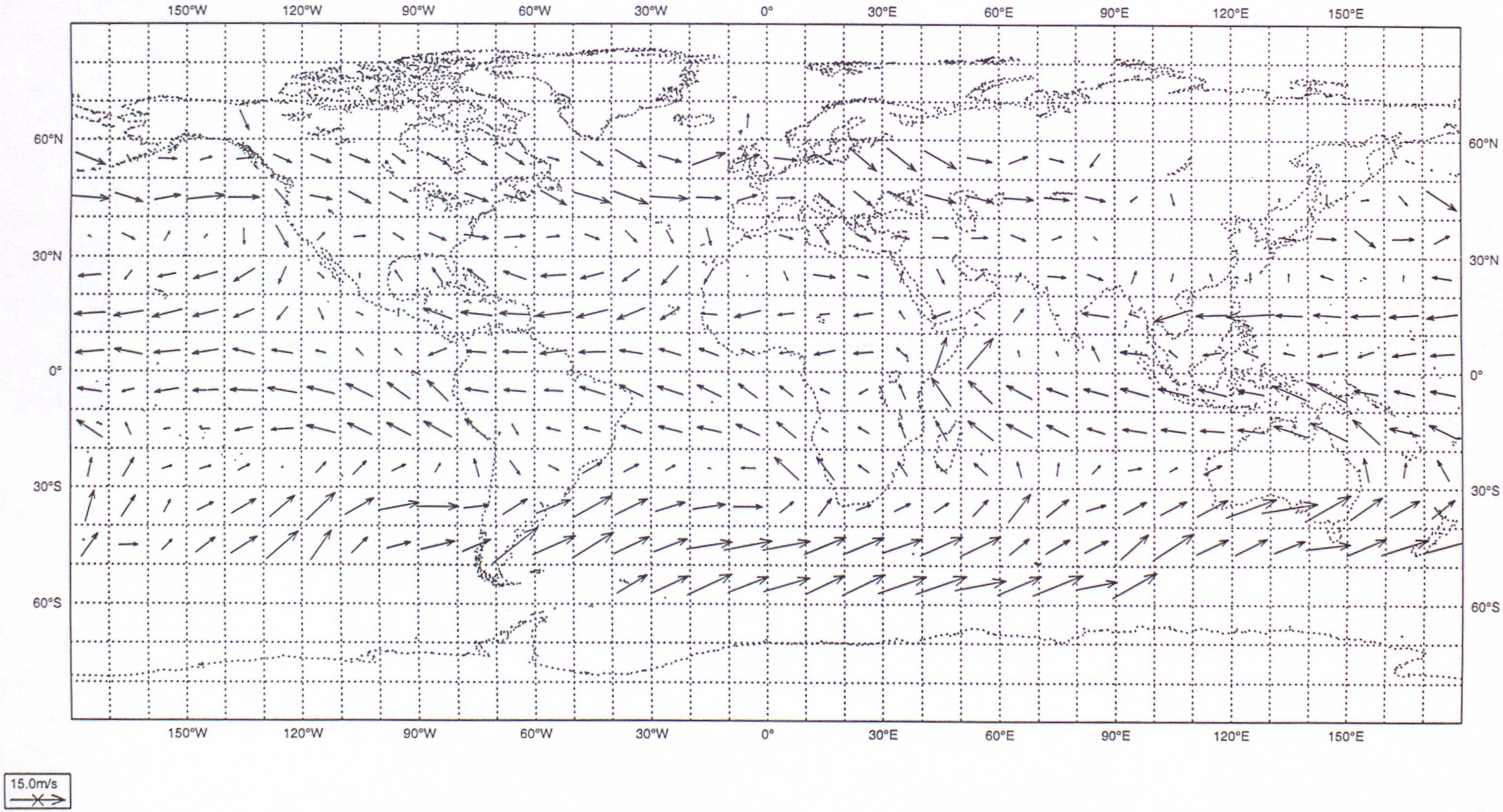

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

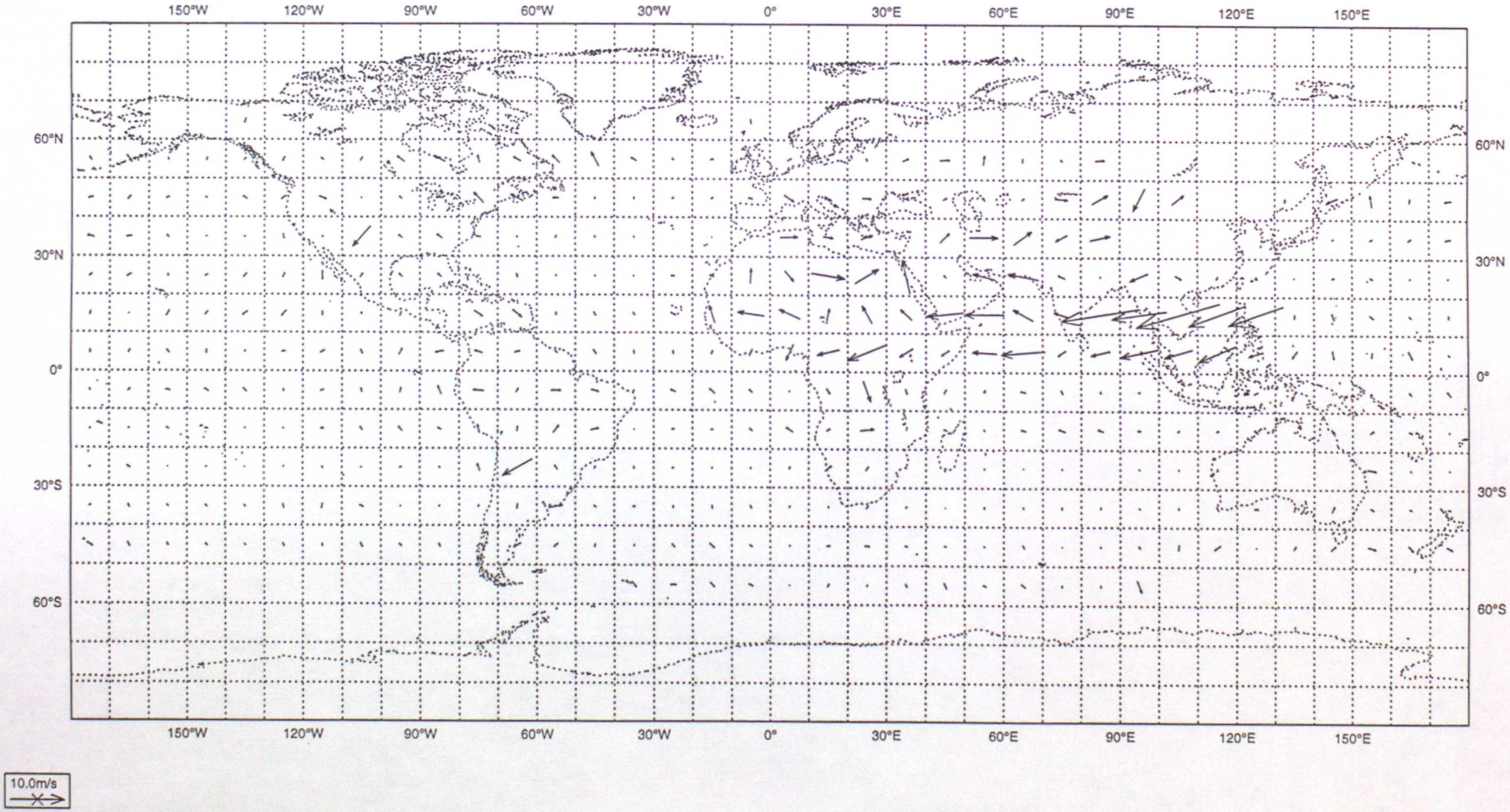

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present

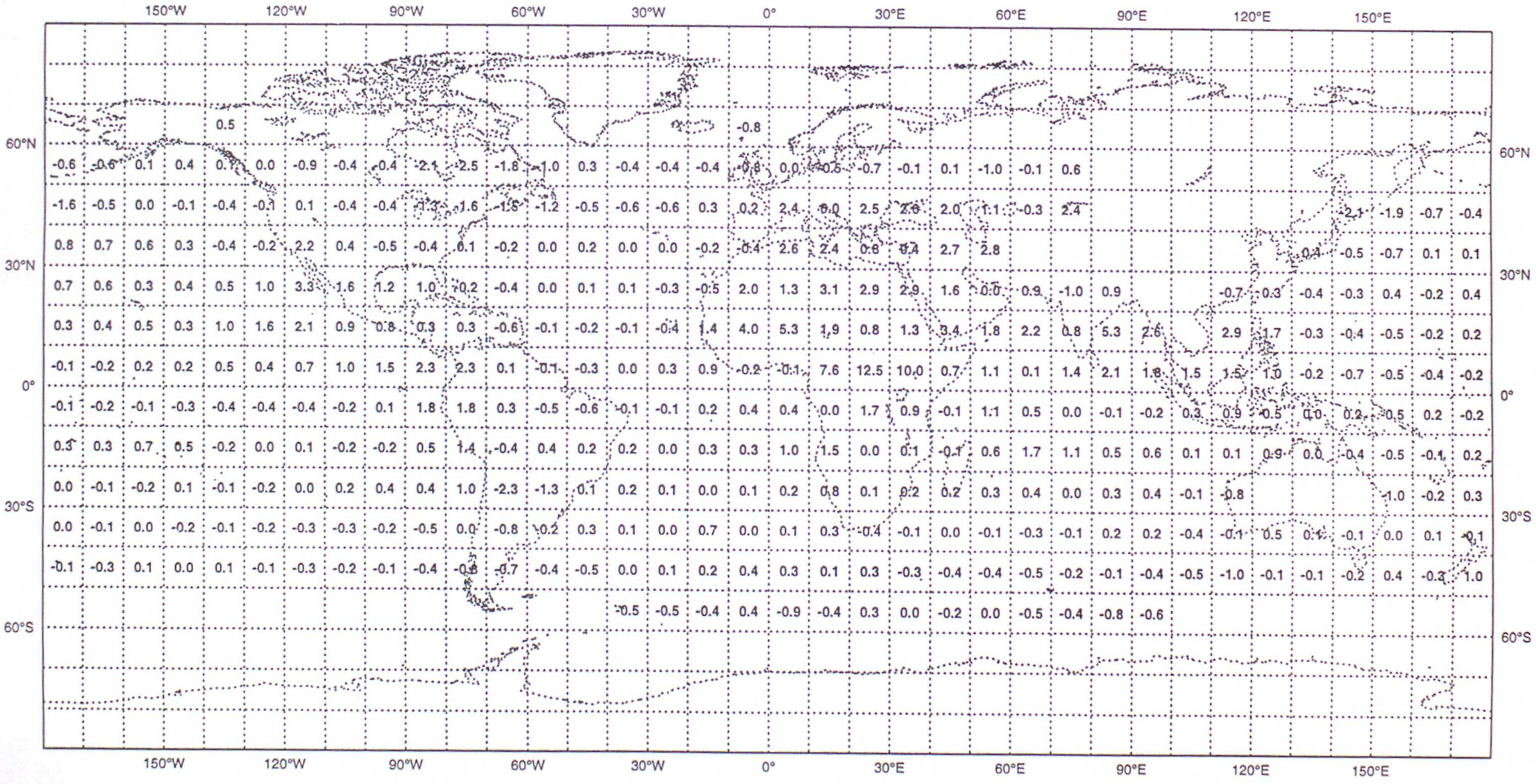

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.5 -0.8
-0.6 -0.6 0.1 0.4 0.7 0.0 -0.9 -0.4 -0.4 -2.1 -2.5 -1.8 -1.0 0.3 -0.4 -0.4 -0.4 -0.8 0.0 -0.5 -0.7 -0.1 0.1 -1.0 -0.1 0.6
-1.6 -0.5 0.0 -0.1 -0.4 -0.1 0.1 -0.4 -0.4 -1.3 -1.6 -1.5 -1.2 -0.5 -0.6 -0.6 0.3 0.2 2.4 0.0 2.5 2.6 2.0 1.1 -0.3 2.4 -2.1 -1.9 -0.7 -0.4
0.8 0.7 0.6 0.3 -0.4 -0.2 2.2 0.4 -0.5 -0.4 0.1 -0.2 0.0 0.2 0.0 0.0 -0.2 -0.4 2.6 2.4 0.8 0.4 2.7 2.8 0.4 -0.5 -0.7 0.1 0.1
0.7 0.6 0.3 0.4 0.5 1.0 3.3 1.6 1.2 1.0 0.2 -0.4 0.0 0.1 0.1 -0.3 -0.5 2.0 1.3 3.1 2.9 2.9 1.6 0.0 0.9 -1.0 0.9 -0.7 0.3 -0.4 -0.3 0.4 -0.2 0.4
0.3 0.4 0.5 0.3 1.0 1.6 2.1 0.9 0.8 0.3 0.3 -0.6 -0.1 -0.2 -0.1 -0.4 1.4 4.0 5.3 1.9 0.8 1.3 3.4 1.8 2.2 0.8 5.3 2.6 2.9 1.7 -0.3 -0.4 -0.5 -0.2 0.2
-0.1 -0.2 0.2 0.2 0.5 0.4 0.7 1.0 1.5 2.3 2.3 0.1 -0.1 -0.3 0.0 0.3 0.9 -0.2 -0.1 7.6 12.5 10.0 0.7 1.1 0.1 1.4 2.1 1.8 1.5 1.5 1.0 -0.2 -0.7 -0.5 -0.4 -0.2
-0.1 -0.2 -0.1 -0.3 -0.4 -0.4 -0.4 -0.2 0.1 1.8 1.8 0.3 -0.5 -0.6 -0.1 -0.1 0.2 0.4 0.4 0.0 1.7 0.9 -0.1 1.1 0.5 0.0 -0.1 -0.2 0.3 0.9 -0.5 0.0 0.2 0.5 0.2 -0.2
0.3 0.3 0.7 0.5 -0.2 0.0 0.1 -0.2 -0.2 0.5 1.4 -0.4 0.4 0.2 0.2 0.0 0.3 0.3 1.0 1.5 0.0 0.1 -0.1 0.6 1.7 1.1 0.5 0.6 0.1 0.1 0.9 0.0 -0.4 -0.5 -0.1 0.2
0.0 -0.1 -0.2 0.1 -0.1 -0.2 0.0 0.2 0.4 0.4 1.0 -2.3 -1.3 0.1 0.2 0.1 0.0 0.1 0.2 0.8 0.1 0.2 0.2 0.3 0.4 0.0 0.3 0.4 -0.1 -0.8 -1.0 -0.2 0.3
0.0 -0.1 0.0 -0.2 -0.1 -0.2 -0.3 -0.3 -0.2 -0.5 0.0 -0.8 0.2 0.3 0.1 0.0 0.7 0.0 0.1 0.3 -0.4 -0.1 0.0 -0.1 -0.3 -0.1 0.2 0.2 -0.4 -0.1 0.5 0.1 -0.1 0.0 0.1 -0.1
-0.1 -0.3 0.1 0.0 0.1 -0.1 -0.3 -0.2 -0.1 -0.4 -0.8 -0.7 -0.4 -0.5 0.0 0.1 0.2 0.4 0.3 0.1 0.3 -0.3 -0.4 -0.4 -0.5 -0.2 -0.1 -0.4 -0.5 -1.0 -0.1 -0.1 -0.2 0.4 -0.3 1.0
-0.5 -0.5 -0.4 0.4 -0.9 -0.4 0.3 0.0 -0.2 0.0 -0.5 -0.4 -0.8 -0.6

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present

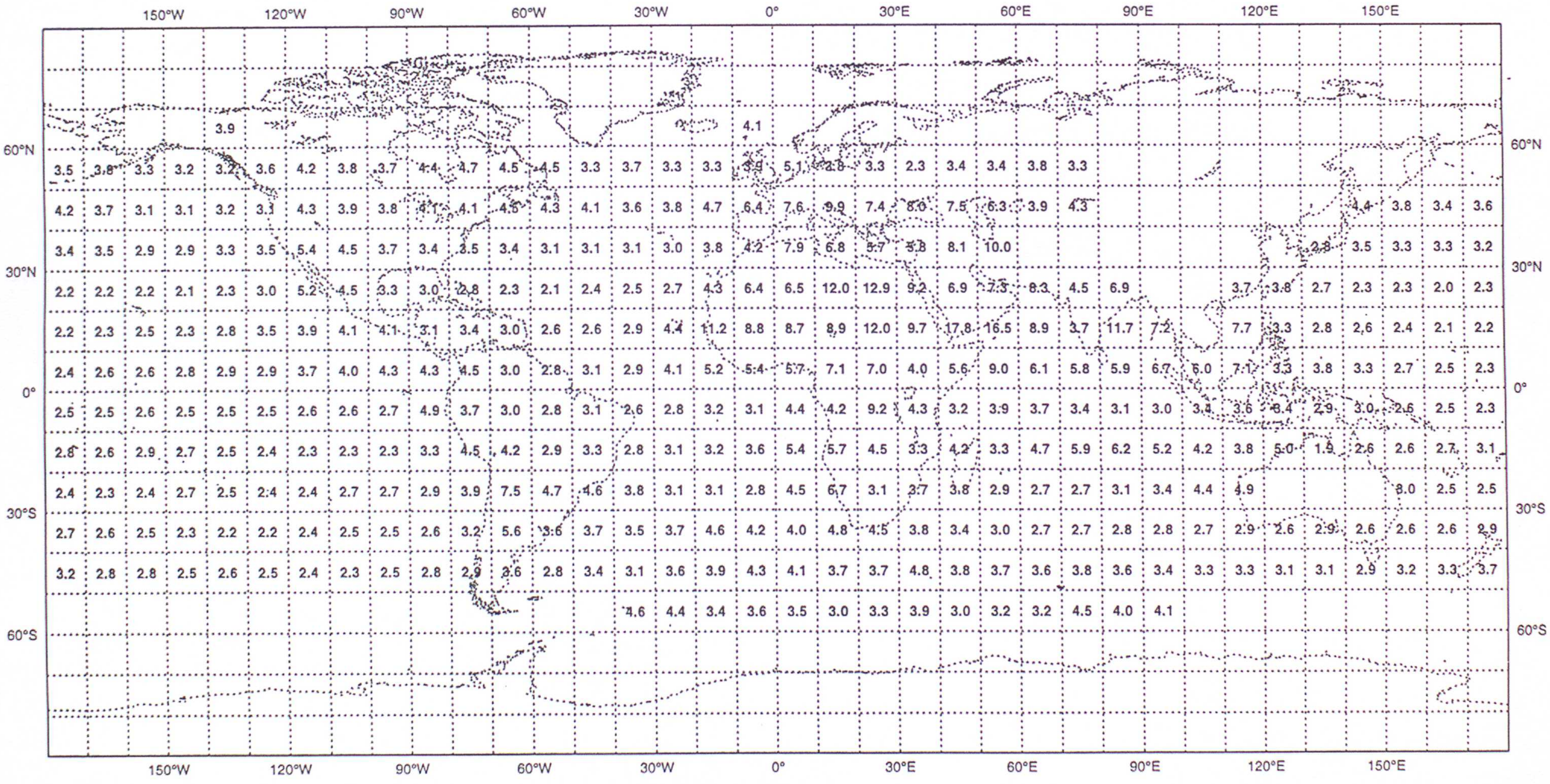

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
3.9 4.1
3.5 3.8 3.3 3.2 3.2 3.6 4.2 3.8 3.7 4.4 4.7 4.5 4.5 3.3 3.7 3.3 3.3 3.9 5.1 2.8 3.3 2.3 3.4 3.4 3.8 3.3
4.2 3.7 3.1 3.1 3.2 3.1 4.3 3.9 3.8 4.1 4.1 4.5 4.3 4.1 3.6 3.8 4.7 6.4 7.6 9.9 7.4 8.0 7.5 6.3 3.9 4.3 4.4 3.8 3.4 3.6
3.4 3.5 2.9 2.9 3.3 3.5 5.4 4.5 3.7 3.4 3.5 3.4 3.1 3.1 3.1 3.0 3.8 4.2 7.9 6.8 5.7 5.8 8.1 10.0 2.8 3.5 3.3 3.3 3.2
2.2 2.2 2.2 2.1 2.3 3.0 5.2 4.5 3.3 3.0 2.8 2.3 2.1 2.4 2.5 2.7 4.3 6.4 6.5 12.0 12.9 9.2 6.9 7.3 8.3 4.5 6.9 3.7 3.8 2.7 2.3 2.3 2.0 2.3
2.2 2.3 2.5 2.3 2.8 3.5 3.9 4.1 4.1 3.1 3.4 3.0 2.6 2.6 2.9 4.4 11.2 8.8 8.7 8.9 12.0 9.7 17.8 16.5 8.9 3.7 11.7 7.2 7.7 3.3 2.8 2.6 2.4 2.1 2.2
2.4 2.6 2.6 2.8 2.9 2.9 3.7 4.0 4.3 4.3 4.5 3.0 2.8 3.1 2.9 4.1 5.2 5.4 5.7 7.1 7.0 4.0 5.6 9.0 6.1 5.8 5.9 6.7 6.0 7.1 3.3 3.8 3.3 2.7 2.5 2.3
2.5 2.5 2.6 2.5 2.5 2.5 2.6 2.6 2.7 4.9 3.7 3.0 2.8 3.1 2.6 2.8 3.2 3.1 4.4 4.2 9.2 4.3 3.2 3.9 3.7 3.4 3.1 3.0 3.4 3.6 8.4 2.9 3.0 2.6 2.5 2.3
2.8 2.6 2.9 2.7 2.5 2.4 2.3 2.3 2.3 3.3 4.5 4.2 2.9 3.3 2.8 3.1 3.2 3.6 5.4 5.7 4.5 3.3 4.2 3.3 4.7 5.9 6.2 5.2 4.2 3.8 5.0 1.9 2.6 2.6 2.7 3.1
2.4 2.3 2.4 2.7 2.5 2.4 2.4 2.7 2.7 2.9 3.9 7.5 4.7 4.6 3.8 3.1 3.1 2.8 4.5 6.7 3.1 3.7 3.8 2.9 2.7 2.7 3.1 3.4 4.4 4.9 8.0 2.5 2.5
2.7 2.6 2.5 2.3 2.2 2.2 2.4 2.5 2.5 2.6 3.2 5.6 3.6 3.7 3.5 3.7 4.6 4.2 4.0 4.8 4.5 3.8 3.4 3.0 2.7 2.7 2.8 2.8 2.7 2.9 2.6 2.9 2.6 2.6 2.6 2.9
3.2 2.8 2.8 2.5 2.6 2.5 2.4 2.3 2.5 2.8 2.9 2.6 2.8 3.4 3.1 3.6 3.9 4.3 4.1 3.7 3.7 4.8 3.8 3.7 3.6 3.8 3.6 3.4 3.3 3.3 3.1 3.1 2.9 3.2 3.3 3.7
4.6 4.4 3.4 3.6 3.5 3.0 3.3 3.9 3.0 3.2 3.2 4.5 4.0 4.1
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 15. SATOB 401 - 700 hPa mean daily count. JUNE 2003
Global average number of observations in 24 hours = 16049

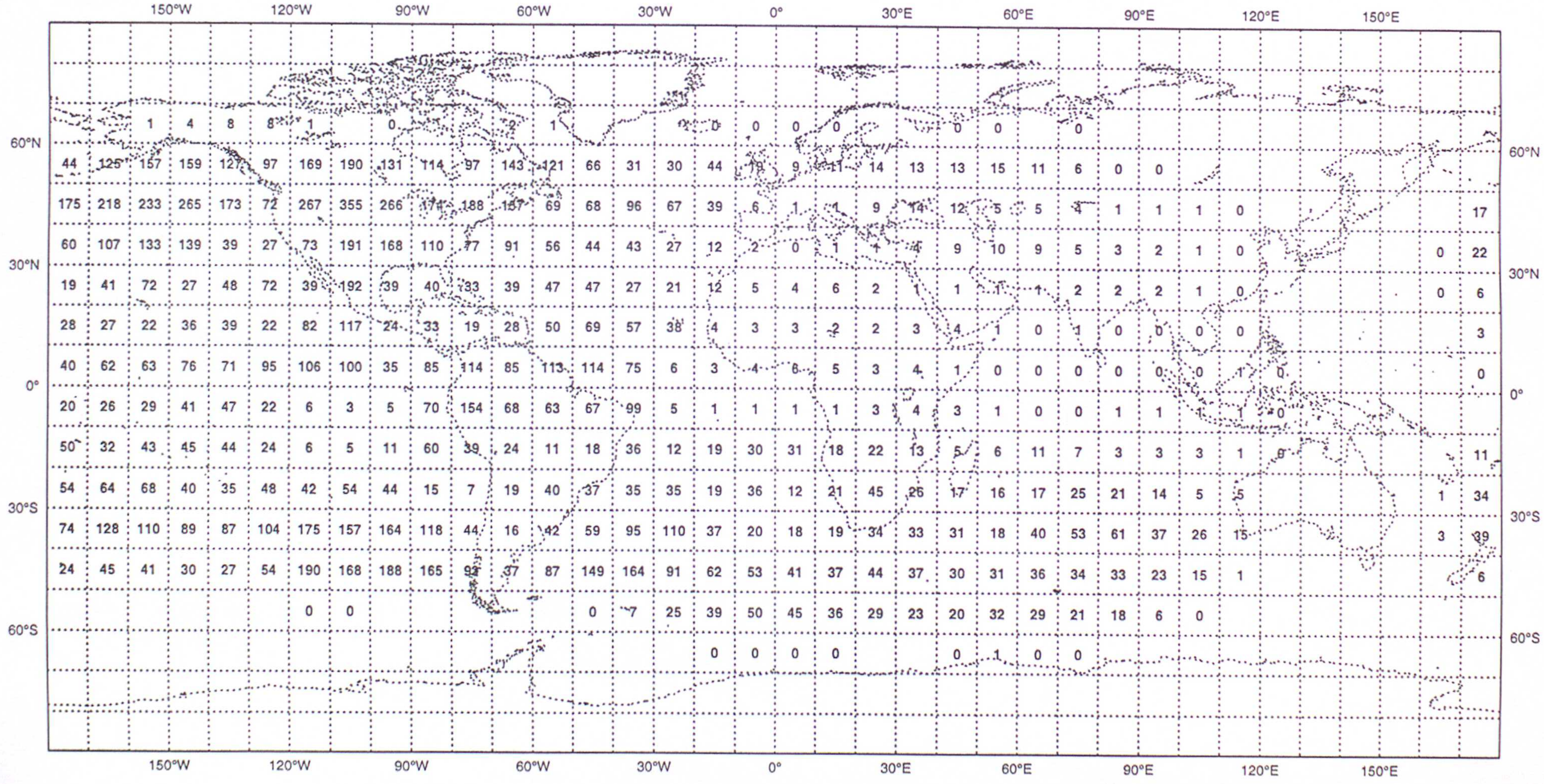

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 4 8 8 1 0 2 1 0 0 0 0 0 0 0
44 125 157 159 127 97 169 190 131 114 97 143 121 66 31 30 44 18 9 11 14 13 13 15 11 6 0 0
175 218 233 265 173 72 267 355 266 174 188 157 69 68 96 67 39 6 1 1 9 14 12 5 5 4 1 1 1 0 17
60 107 133 139 39 27 73 191 168 110 77 91 56 44 43 27 12 2 0 1 1 4 9 10 9 5 3 2 1 0 0 22
19 41 72 27 48 72 39 192 39 40 33 39 47 47 27 21 12 5 4 6 2 1 1 1 1 2 2 2 1 0 0 6
28 27 22 36 39 22 82 117 24 33 19 28 50 69 57 38 4 3 3 2 2 3 4 1 0 1 0 0 0 0 3
40 62 63 76 71 95 106 100 35 85 114 85 113 114 75 6 3 4 6 5 3 4 1 0 0 0 0 0 0 1 0 0
20 26 29 41 47 22 6 3 5 70 154 68 63 67 99 5 1 1 1 1 3 4 3 1 0 0 1 1 1 1 0
50 32 43 45 44 24 6 5 11 60 39 24 11 18 36 12 19 30 31 18 22 13 5 6 11 7 3 3 3 1 0 11
54 64 68 40 35 48 42 54 44 15 7 19 40 37 35 35 19 36 12 21 45 26 17 16 17 25 21 14 5 5 1 34
74 128 110 89 87 104 175 157 164 118 44 16 42 59 95 110 37 20 18 19 34 33 31 18 40 53 61 37 26 15 3 39
24 45 41 30 27 54 190 168 188 165 93 37 87 149 164 91 62 53 41 37 44 37 30 31 36 34 33 23 15 1 6
0 0 0 7 25 39 50 45 36 29 23 20 32 29 21 18 6 0
0 0 0 0 0 1 0 0
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 16. SATOB 401 - 700 hPa vector mean wind. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

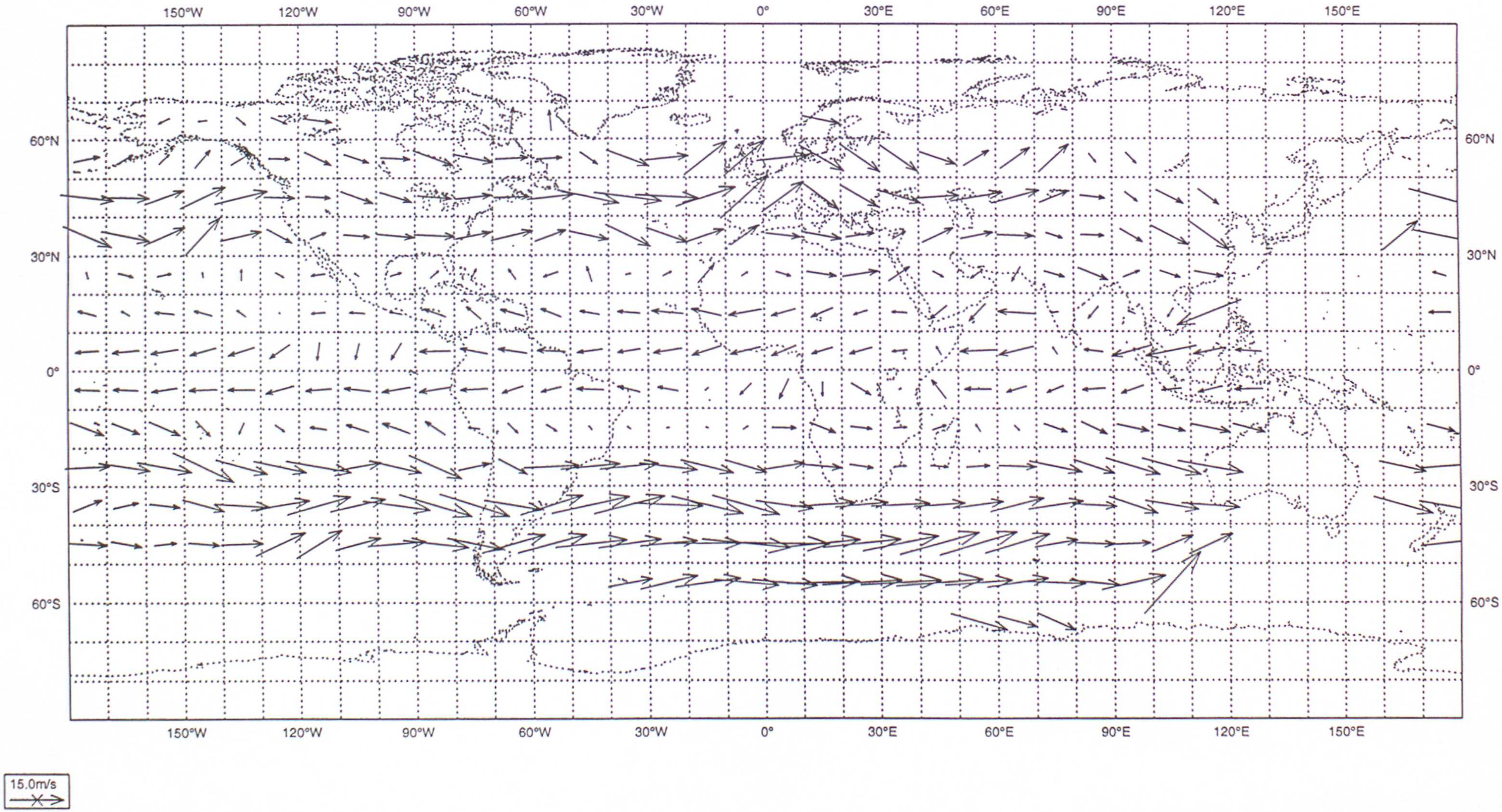

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

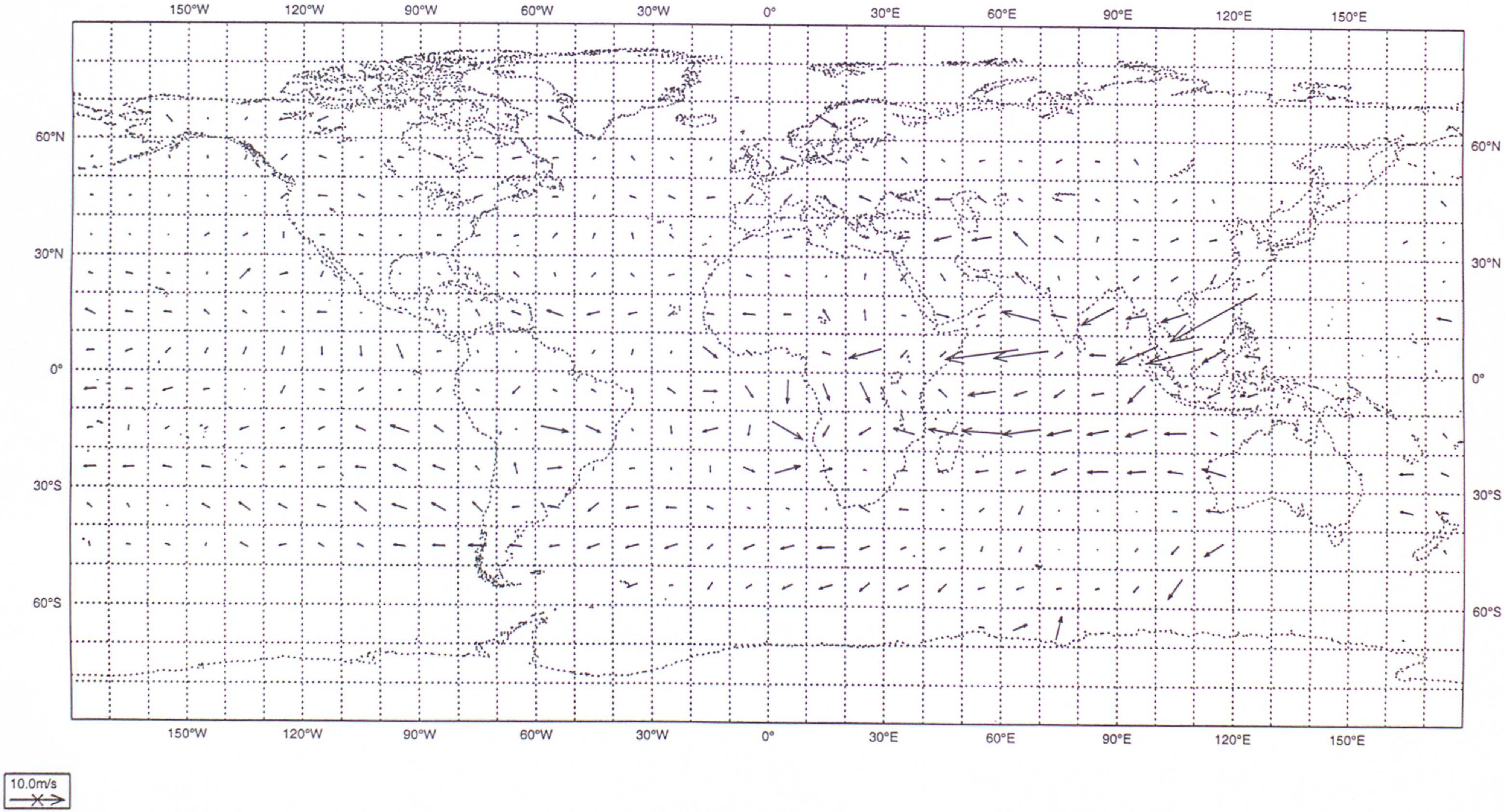

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present

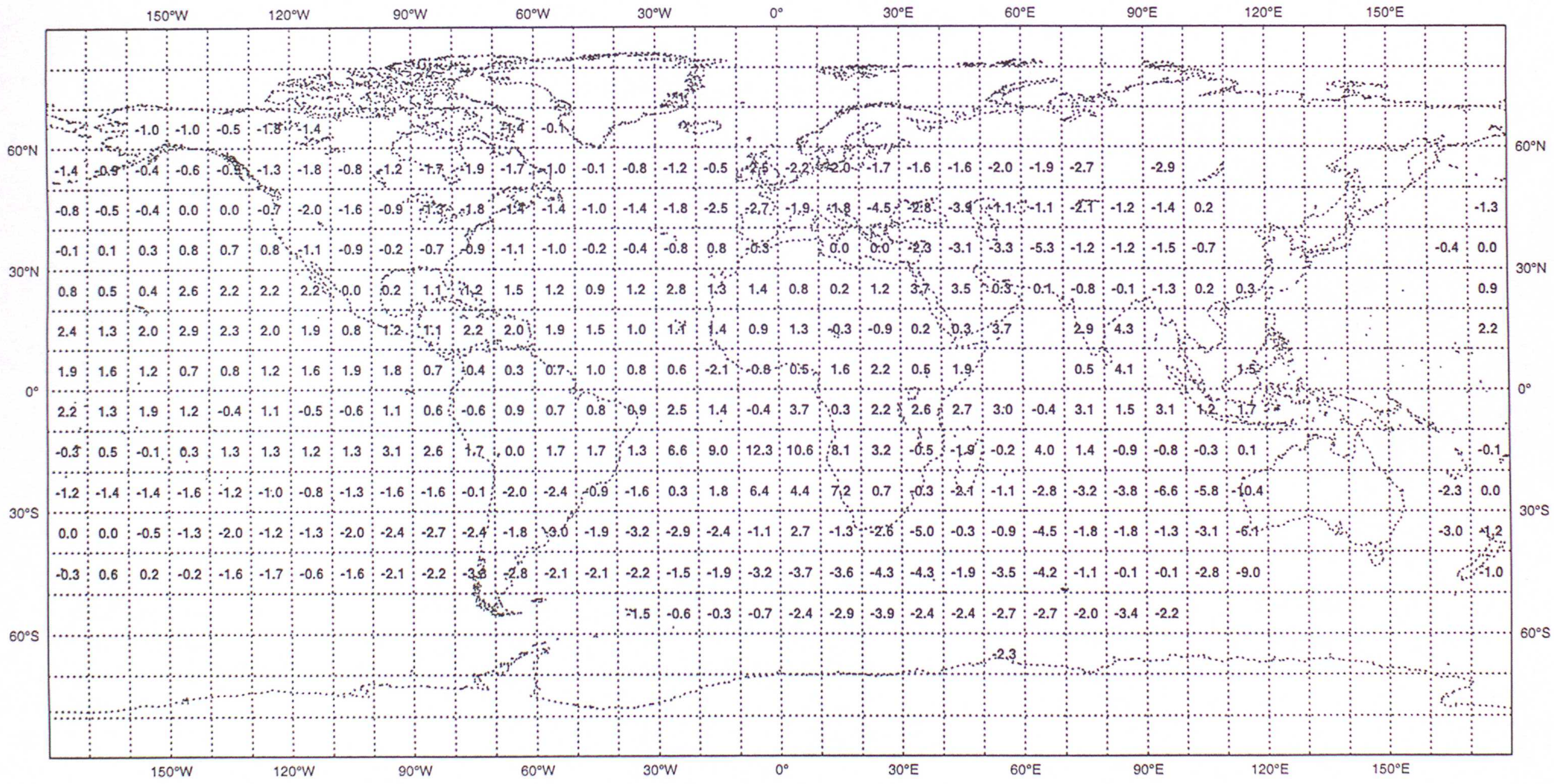

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-1.0 -1.0 -0.5 -1.8 -1.4 -1.4 -0.1
-1.4 -0.9 -0.4 -0.6 -0.5 -1.3 -1.8 -0.8 -1.2 -1.7 -1.9 -1.7 -1.0 -0.1 -0.8 -1.2 -0.5 -2.5 -2.2 -2.0 -1.7 -1.6 -1.6 -2.0 -1.9 -2.7 -2.9
-0.8 -0.5 -0.4 0.0 0.0 -0.7 -2.0 -1.6 -0.9 -1.3 -1.8 -1.4 -1.4 -1.0 -1.4 -1.8 -2.5 -2.7 -1.9 -1.8 -4.5 -2.8 -3.9 -1.1 -1.1 -2.1 -1.2 -1.4 0.2 -1.3
-0.1 0.1 0.3 0.8 0.7 0.8 -1.1 -0.9 -0.2 -0.7 -0.9 -1.1 -1.0 -0.2 -0.4 -0.8 0.8 -0.3 0.0 0.0 -2.3 -3.1 -3.3 -5.3 -1.2 -1.2 -1.5 -0.7 -0.4 0.0
0.8 0.5 0.4 2.6 2.2 2.2 2.2 0.0 0.2 1.1 1.2 1.5 1.2 0.9 1.2 2.8 1.3 1.4 0.8 0.2 1.2 3.7 3.5 0.3 0.1 -0.8 -0.1 -1.3 0.2 0.3 0.9
2.4 1.3 2.0 2.9 2.3 2.0 1.9 0.8 1.2 1.1 2.2 2.0 1.9 1.5 1.0 1.1 1.4 0.9 1.3 -0.3 -0.9 0.2 0.3 3.7 2.9 4.3 2.2
1.9 1.6 1.2 0.7 0.8 1.2 1.6 1.9 1.8 0.7 0.4 0.3 0.7 1.0 0.8 0.6 -2.1 -0.8 0.5 1.6 2.2 0.5 1.9 0.5 4.1 1.5
2.2 1.3 1.9 1.2 -0.4 1.1 -0.5 -0.6 1.1 0.6 -0.6 0.9 0.7 0.8 0.9 2.5 1.4 -0.4 3.7 0.3 2.2 2.6 2.7 3.0 -0.4 3.1 1.5 3.1 1.2 1.7
-0.3 0.5 -0.1 0.3 1.3 1.3 1.2 1.3 3.1 2.6 1.7 0.0 1.7 1.7 1.3 6.6 9.0 12.3 10.6 8.1 3.2 -0.5 -1.9 -0.2 4.0 1.4 -0.9 -0.8 -0.3 0.1 -0.1
-1.2 -1.4 -1.4 -1.6 -1.2 -1.0 -0.8 -1.3 -1.6 -1.6 -0.1 -2.0 -2.4 -0.9 -1.6 0.3 1.8 6.4 4.4 7.2 0.7 -0.3 -2.1 -1.1 -2.8 -3.2 -3.8 -6.6 -5.8 -10.4 -2.3 0.0
0.0 0.0 -0.5 -1.3 -2.0 -1.2 -1.3 -2.0 -2.4 -2.7 -2.4 -1.8 -3.0 -1.9 -3.2 -2.9 -2.4 -1.1 2.7 -1.3 -2.6 -5.0 -0.3 -0.9 -4.5 -1.8 -1.8 -1.3 -3.1 -6.1 -3.0 -1.2
-0.3 0.6 0.2 -0.2 -1.6 -1.7 -0.6 -1.6 -2.1 -2.2 -3.8 -2.8 -2.1 -2.1 -2.2 -1.5 -1.9 -3.2 -3.7 -3.6 -4.3 -4.3 -1.9 -3.5 -4.2 -1.1 -0.1 -0.1 -2.8 -9.0 -1.0
-1.5 -0.6 -0.3 -0.7 -2.4 -2.9 -3.9 -2.4 -2.4 -2.7 -2.7 -2.0 -3.4 -2.2
-2.3

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present

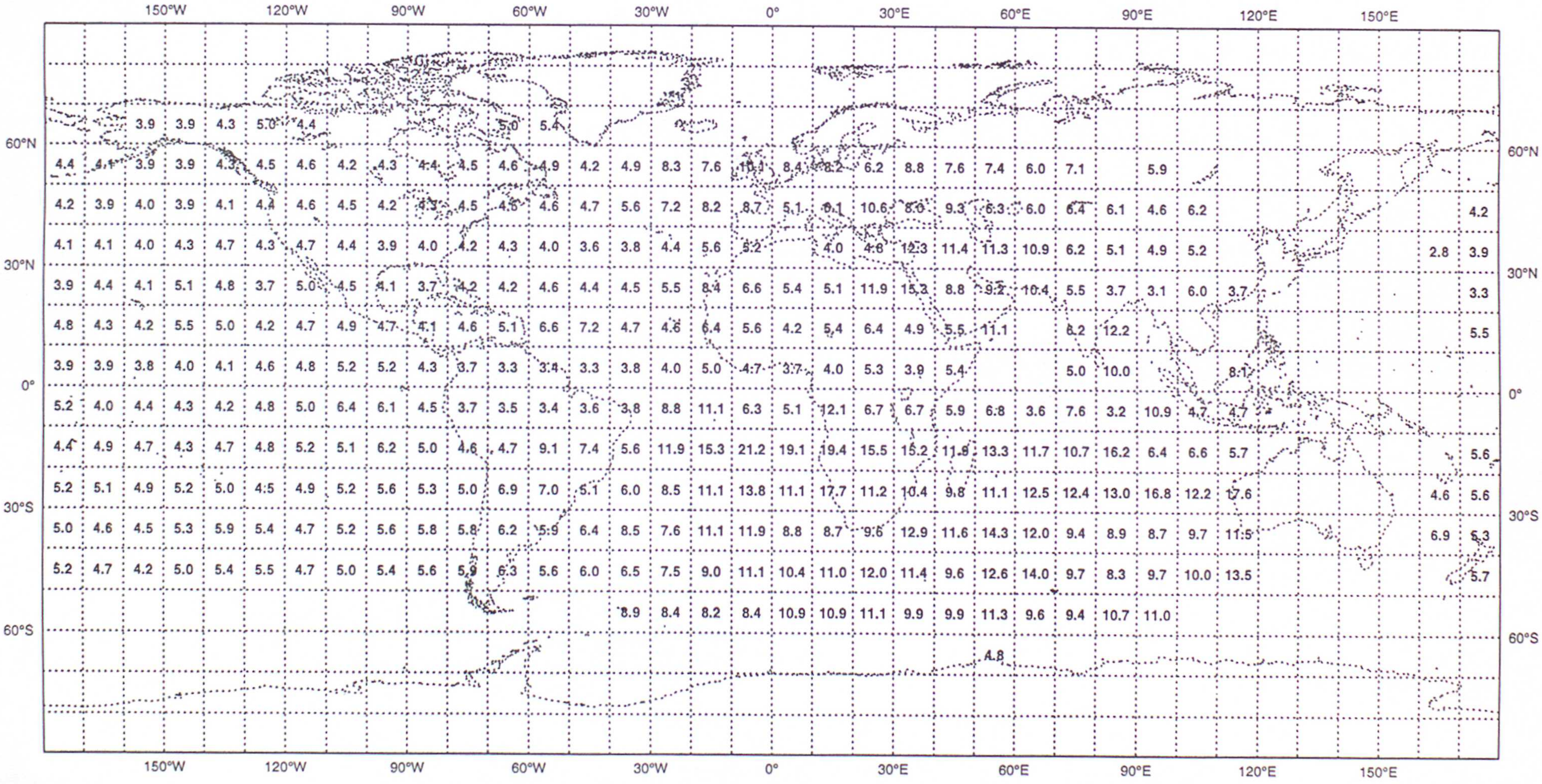

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
3.9 3.9 4.3 5.0 4.4 5.0 5.4
4.4 4.1 3.9 3.9 4.3 4.5 4.6 4.2 4.3 4.4 4.5 4.6 4.9 4.2 4.9 8.3 7.6 10.1 8.4 8.2 6.2 8.8 7.6 7.4 6.0 7.1 5.9
4.2 3.9 4.0 3.9 4.1 4.4 4.6 4.5 4.2 4.3 4.5 4.5 4.6 4.7 5.6 7.2 8.2 8.7 5.1 8.1 10.6 8.0 9.3 6.3 6.0 6.4 6.1 4.6 6.2 4.2
4.1 4.1 4.0 4.3 4.7 4.3 4.7 4.4 3.9 4.0 4.2 4.3 4.0 3.6 3.8 4.4 5.6 5.2 4.0 4.8 12.3 11.4 11.3 10.9 6.2 5.1 4.9 5.2 2.8 3.9
3.9 4.4 4.1 5.1 4.8 3.7 5.0 4.5 4.1 3.7 4.2 4.2 4.6 4.4 4.5 5.5 8.4 6.6 5.4 5.1 11.9 15.3 8.8 9.2 10.4 5.5 3.7 3.1 6.0 3.7 3.3
4.8 4.3 4.2 5.5 5.0 4.2 4.7 4.9 4.7 4.1 4.6 5.1 6.6 7.2 4.7 4.6 6.4 5.6 4.2 5.4 6.4 4.9 5.5 11.1 8.2 12.2 5.5
3.9 3.9 3.8 4.0 4.1 4.6 4.8 5.2 5.2 4.3 3.7 3.3 3.4 3.3 3.8 4.0 5.0 4.7 3.7 4.0 5.3 3.9 5.4 5.0 10.0 8.1
5.2 4.0 4.4 4.3 4.2 4.8 5.0 6.4 6.1 4.5 3.7 3.5 3.4 3.6 3.8 8.8 11.1 6.3 5.1 12.1 6.7 6.7 5.9 6.8 3.6 7.6 3.2 10.9 4.7 4.7
4.4 4.9 4.7 4.3 4.7 4.8 5.2 5.1 6.2 5.0 4.6 4.7 9.1 7.4 5.6 11.9 15.3 21.2 19.1 19.4 15.5 15.2 11.8 13.3 11.7 10.7 16.2 6.4 6.6 5.7 5.6
5.2 5.1 4.9 5.2 5.0 4.5 4.9 5.2 5.6 5.3 5.0 6.9 7.0 5.1 6.0 8.5 11.1 13.8 11.1 17.7 11.2 10.4 9.8 11.1 12.5 12.4 13.0 16.8 12.2 17.6 4.6 5.6
5.0 4.6 4.5 5.3 5.9 5.4 4.7 5.2 5.6 5.8 5.8 6.2 5.9 6.4 8.5 7.6 11.1 11.9 8.8 8.7 9.6 12.9 11.6 14.3 12.0 9.4 8.9 8.7 9.7 11.5 6.9 5.3
5.2 4.7 4.2 5.0 5.4 5.5 4.7 5.0 5.4 5.6 5.9 6.3 5.6 6.0 6.5 7.5 9.0 11.1 10.4 11.0 12.0 11.4 9.6 12.6 14.0 9.7 8.3 9.7 10.0 13.5 5.7
8.9 8.4 8.2 8.4 10.9 10.9 11.1 9.9 9.9 11.3 9.6 9.4 10.7 11.0
4.8

Figure 20. SATOB 101 - 400 hPa mean daily count. JUNE 2003
Global average number of observations in 24 hours = 192148

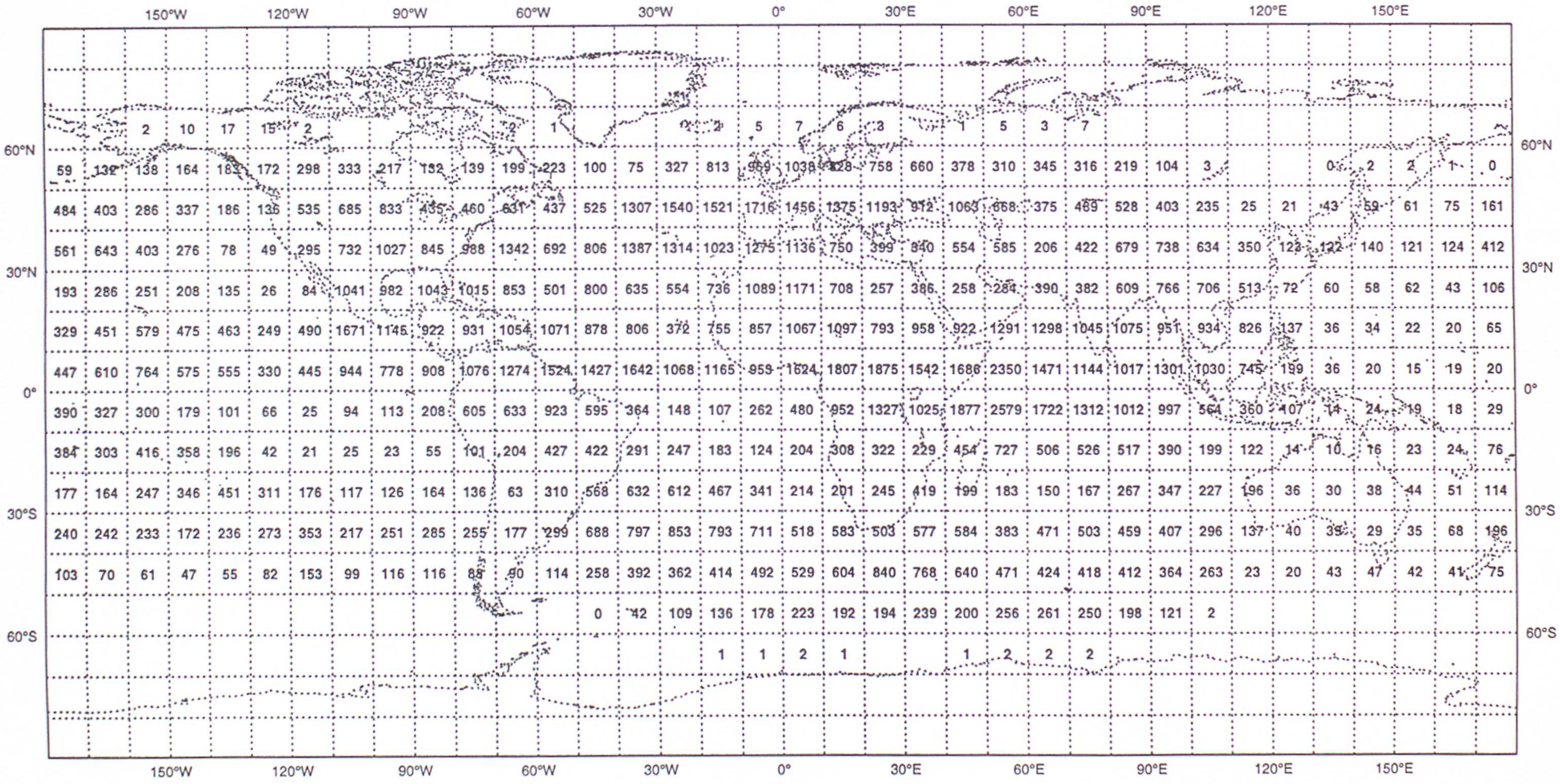

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2 10 17 15 2 2 1 2 5 7 6 3 1 5 3 7
59 132 138 164 183 172 298 333 217 132 139 199 223 100 75 327 813 969 1038 828 758 660 378 310 345 316 219 104 3 0 2 2 1 0
484 403 286 337 186 136 535 685 833 435 460 631 437 525 1307 1540 1521 1716 1456 1375 1193 912 1063 668 375 469 528 403 235 25 21 43 59 61 75 161
561 643 403 276 78 49 295 732 1027 845 988 1342 692 806 1387 1314 1023 1275 1136 750 399 840 554 585 206 422 679 738 634 350 123 122 140 121 124 412
193 286 251 208 135 26 84 1041 982 1043 1015 853 501 800 635 554 736 1089 1171 708 257 386 258 284 390 382 609 766 706 513 72 60 58 62 43 106
329 451 579 475 463 249 490 1671 1145 922 931 1054 1071 878 806 372 755 857 1067 1097 793 958 922 1291 1298 1045 1075 951 934 826 137 36 34 22 20 65
447 610 764 575 555 330 445 944 778 908 1076 1274 1524 1427 1642 1068 1165 959 1624 1807 1875 1542 1686 2350 1471 1144 1017 1301 1030 745 199 36 20 15 19 20
390 327 300 179 101 66 25 94 113 208 605 633 923 595 364 148 107 262 480 952 1327 1025 1877 2579 1722 1312 1012 997 564 360 107 14 24 19 18 29
384 303 416 358 196 42 21 25 23 55 101 204 427 422 291 247 183 124 204 308 322 229 454 727 506 526 517 390 199 122 14 10 16 23 24 76
177 164 247 346 451 311 176 117 126 164 136 63 310 568 632 612 467 341 214 201 245 419 199 183 150 167 267 347 227 196 36 30 38 44 51 114
240 242 233 172 236 273 353 217 251 285 255 177 299 688 797 853 793 711 518 583 503 577 584 383 471 503 459 407 296 137 40 39 29 35 68 196
103 70 61 47 55 82 153 99 116 116 88 90 114 258 392 362 414 492 529 604 840 768 640 471 424 418 412 364 263 23 20 43 47 42 41 75
0 42 109 136 178 223 192 194 239 200 256 261 250 198 121 2
1 1 2 1 1 2 2 2

Figure 21. SATOB 101 - 400 hPa vector mean wind. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

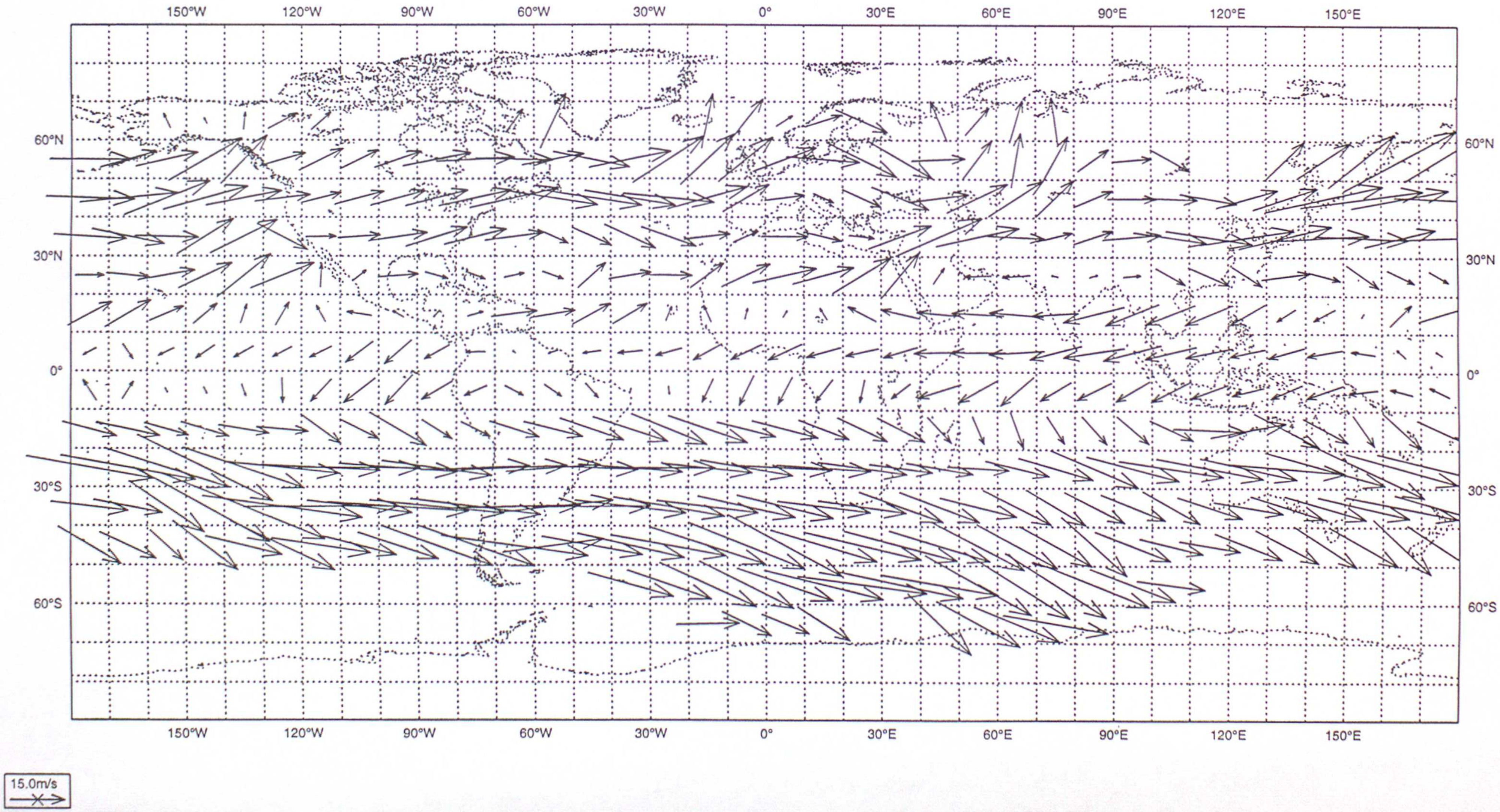

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. JUNE 2003
All observations
Arrows are plotted where greater than 10 obs are present

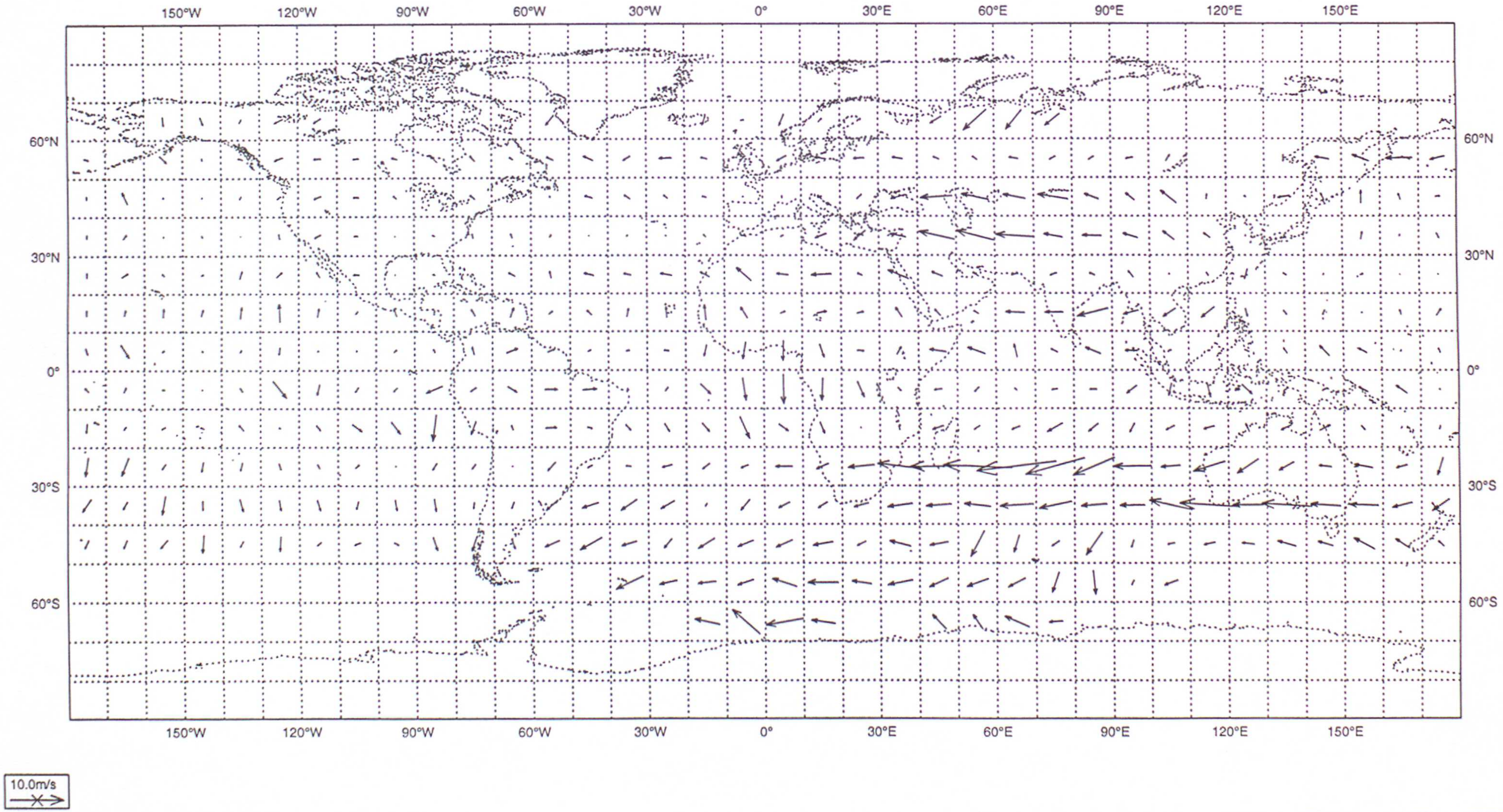

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present

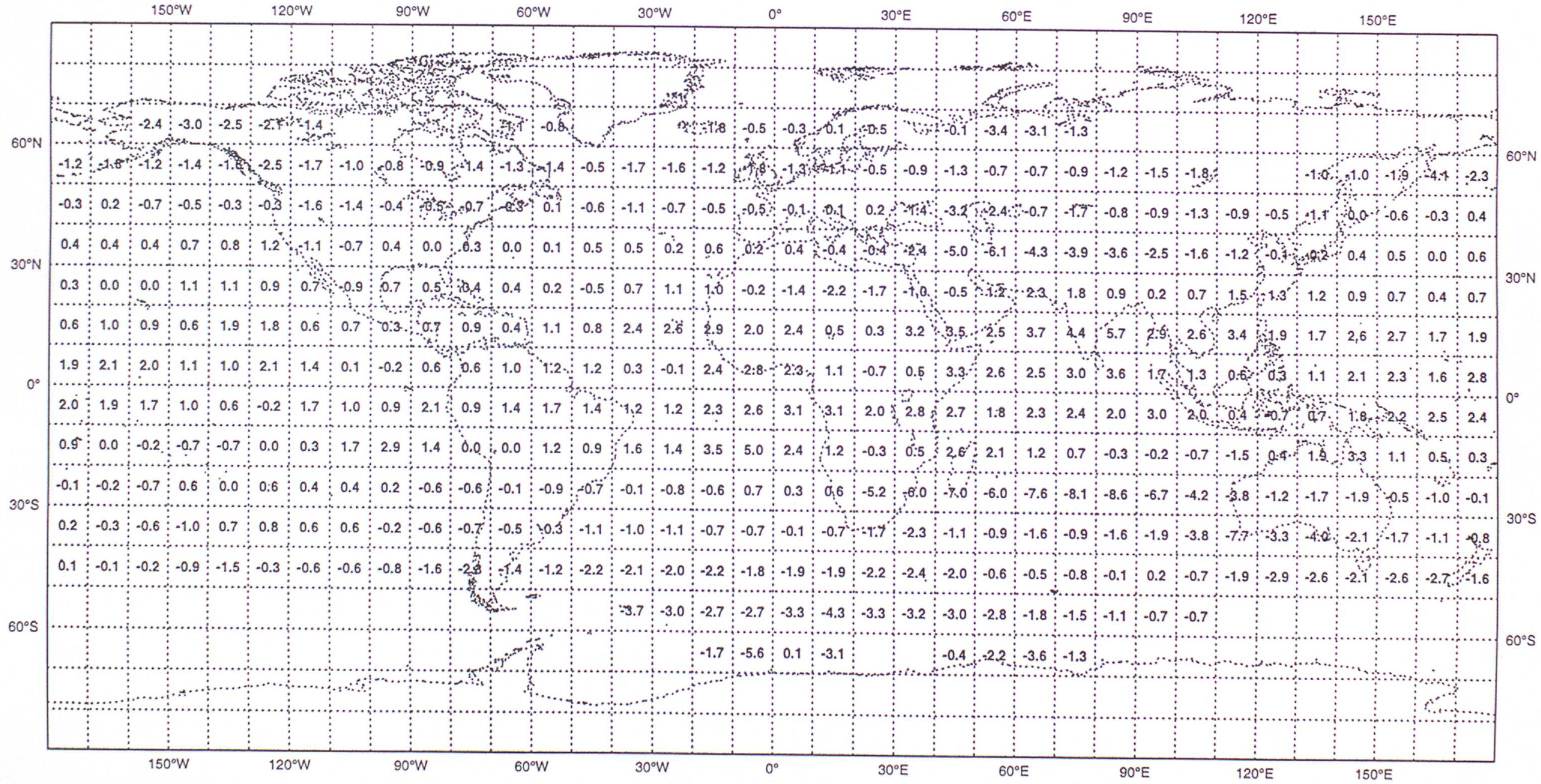
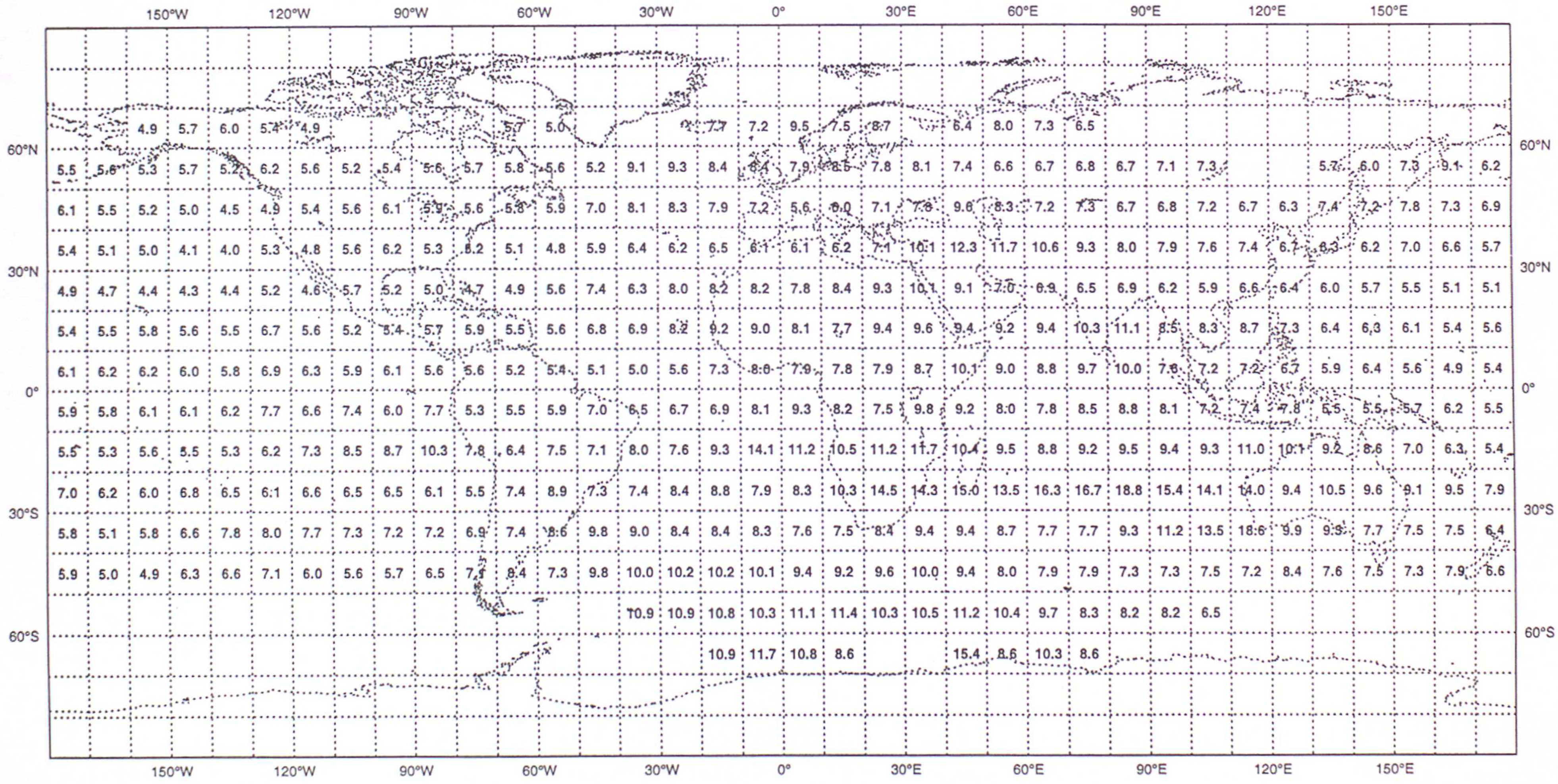

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-2.4 -3.0 -2.5 -2.1 -1.4 -1.1 -0.8 -1.8 -0.5 -0.3 0.1 -0.5 -0.1 -3.4 -3.1 -1.3
-1.2 -1.8 -1.2 -1.4 -1.8 -2.5 -1.7 -1.0 -0.8 -0.9 -1.4 -1.3 -1.4 -0.5 -1.7 -1.6 -1.2 -1.8 -1.3 -1.1 -0.5 -0.9 -1.3 -0.7 -0.7 -0.9 -1.2 -1.5 -1.8 -1.0 -1.0 -1.9 -4.1 -2.3
-0.3 0.2 -0.7 -0.5 -0.3 -0.3 -1.6 -1.4 -0.4 -0.5 -0.7 -0.3 0.1 -0.6 -1.1 -0.7 -0.5 -0.5 -0.5 -0.1 0.1 0.2 -1.4 -3.2 -2.4 -0.7 -1.7 -0.8 -0.9 -1.3 -0.9 -0.5 -1.1 0.0 -0.6 -0.3 0.4
0.4 0.4 0.4 0.7 0.8 1.2 -1.1 -0.7 0.4 0.0 0.3 0.0 0.1 0.5 0.5 0.2 0.6 0.2 0.4 -0.4 -0.4 -2.4 -5.0 -6.1 -4.3 -3.9 -3.6 -2.5 -1.6 -1.2 -0.1 -0.2 0.4 0.5 0.0 0.6
0.3 0.0 0.0 1.1 1.1 0.9 0.7 -0.9 0.7 0.5 0.4 0.4 0.2 -0.5 0.7 1.1 1.0 -0.2 -1.4 -2.2 -1.7 -1.0 -0.5 1.2 2.3 1.8 0.9 0.2 0.7 1.5 1.3 1.2 0.9 0.7 0.4 0.7
0.6 1.0 0.9 0.6 1.9 1.8 0.6 0.7 0.3 0.7 0.9 0.4 1.1 0.8 2.4 2.6 2.9 2.0 2.4 0.5 0.3 3.2 3.5 2.5 3.7 4.4 5.7 2.9 2.6 3.4 1.9 1.7 2.6 2.7 1.7 1.9
1.9 2.1 2.0 1.1 1.0 2.1 1.4 0.1 -0.2 0.6 0.6 1.0 1.2 1.2 0.3 -0.1 2.4 2.8 2.3 1.1 -0.7 0.5 3.3 2.6 2.5 3.0 3.6 1.7 1.3 0.6 0.3 1.1 2.1 2.3 1.6 2.8
2.0 1.9 1.7 1.0 0.6 -0.2 1.7 1.0 0.9 2.1 0.9 1.4 1.7 1.4 1.2 1.2 2.3 2.6 3.1 3.1 2.0 2.8 2.7 1.8 2.3 2.4 2.0 3.0 2.0 0.4 -0.7 0.7 1.8 2.2 2.5 2.4
0.9 0.0 -0.2 -0.7 -0.7 0.0 0.3 1.7 2.9 1.4 0.0 0.0 1.2 0.9 1.6 1.4 3.5 5.0 2.4 1.2 -0.3 0.5 2.6 2.1 1.2 0.7 -0.3 -0.2 -0.7 -1.5 0.4 1.9 3.3 1.1 0.5 0.3
-0.1 -0.2 -0.7 0.6 0.0 0.6 0.4 0.4 0.2 -0.6 -0.6 -0.1 -0.9 -0.7 -0.1 -0.8 -0.6 0.7 0.3 0.6 -5.2 -6.0 -7.0 -6.0 -7.6 -8.1 -8.6 -6.7 -4.2 -3.8 -1.2 -1.7 -1.9 -0.5 -1.0 -0.1
0.2 -0.3 -0.6 -1.0 0.7 0.8 0.6 0.6 -0.2 -0.6 -0.7 -0.5 0.3 -1.1 -1.0 -1.1 -0.7 -0.7 -0.1 -0.7 -1.7 -2.3 -1.1 -0.9 -1.6 -0.9 -1.6 -1.9 -3.8 -7.7 -3.3 -4.0 -2.1 -1.7 -1.1 -0.8
0.1 -0.1 -0.2 -0.9 -1.5 -0.3 -0.6 -0.6 -0.8 -1.6 -2.3 -1.4 -1.2 -2.2 -2.1 -2.0 -2.2 -1.8 -1.9 -1.9 -2.2 -2.4 -2.0 -0.6 -0.5 -0.8 -0.1 0.2 -0.7 -1.9 -2.9 -2.6 -2.1 -2.6 -2.7 -1.6
-3.7 -3.0 -2.7 -2.7 -3.3 -4.3 -3.3 -3.2 -3.0 -2.8 -1.8 -1.5 -1.1 -0.7 -0.7
-1.7 -5.6 0.1 -3.1 -0.4 -2.2 -3.6 -1.3

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). JUNE 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.9 5.7 6.0 5.4 4.9 5.7 5.0 7.7 7.2 9.5 7.5 8.7 6.4 8.0 7.3 6.5
5.5 5.6 5.3 5.7 5.2 6.2 5.6 5.2 5.4 5.6 5.7 5.8 5.6 5.2 9.1 9.3 8.4 8.4 7.9 8.5 7.8 8.1 7.4 6.6 6.7 6.8 6.7 7.1 7.3 5.7 6.0 7.3 9.1 6.2
6.1 5.5 5.2 5.0 4.5 4.9 5.4 5.6 6.1 5.9 5.6 5.8 5.9 7.0 8.1 8.3 7.9 7.2 5.6 6.0 7.1 7.8 9.6 8.3 7.2 7.3 6.7 6.8 7.2 6.7 6.3 7.4 7.2 7.8 7.3 6.9
5.4 5.1 5.0 4.1 4.0 5.3 4.8 5.6 6.2 5.3 6.2 5.1 4.8 5.9 6.4 6.2 6.5 6.1 6.1 6.2 7.1 10.1 12.3 11.7 10.6 9.3 8.0 7.9 7.6 7.4 6.7 6.3 6.2 7.0 6.6 5.7
4.9 4.7 4.4 4.3 4.4 5.2 4.6 5.7 5.2 5.0 4.7 4.9 5.6 7.4 6.3 8.0 8.2 8.2 7.8 8.4 9.3 10.1 9.1 7.0 6.9 6.5 6.9 6.2 5.9 6.6 6.4 6.0 5.7 5.5 5.1 5.1
5.4 5.5 5.8 5.6 5.5 6.7 5.6 5.2 5.4 5.7 5.9 5.5 5.6 6.8 6.9 8.2 9.2 9.0 8.1 7.7 9.4 9.6 9.4 9.2 9.4 10.3 11.1 8.5 8.3 8.7 7.3 6.4 6.3 6.1 5.4 5.6
6.1 6.2 6.2 6.0 5.8 6.9 6.3 5.9 6.1 5.6 5.6 5.2 5.4 5.1 5.0 5.6 7.3 8.6 7.9 7.8 7.9 8.7 10.1 9.0 8.8 9.7 10.0 7.6 7.2 7.2 6.7 5.9 6.4 5.6 4.9 5.4
5.9 5.8 6.1 6.1 6.2 7.7 6.6 7.4 6.0 7.7 5.3 5.5 5.9 7.0 6.5 6.7 6.9 8.1 9.3 8.2 7.5 9.8 9.2 8.0 7.8 8.5 8.8 8.1 7.2 7.4 7.8 6.5 5.5 5.7 6.2 5.5
5.5 5.3 5.6 5.5 5.3 6.2 7.3 8.5 8.7 10.3 7.8 6.4 7.5 7.1 8.0 7.6 9.3 14.1 11.2 10.5 11.2 11.7 10.4 9.5 8.8 9.2 9.5 9.4 9.3 11.0 10.1 9.2 8.6 7.0 6.3 5.4
7.0 6.2 6.0 6.8 6.5 6.1 6.6 6.5 6.5 6.1 5.5 7.4 8.9 7.3 7.4 8.4 8.8 7.9 8.3 10.3 14.5 14.3 15.0 13.5 16.3 16.7 18.8 15.4 14.1 14.0 9.4 10.5 9.6 9.1 9.5 7.9
5.8 5.1 5.8 6.6 7.8 8.0 7.7 7.3 7.2 7.2 6.9 7.4 8.6 9.8 9.0 8.4 8.4 8.3 7.6 7.5 8.4 9.4 9.4 8.7 7.7 7.7 9.3 11.2 13.5 18.6 9.9 9.3 7.7 7.5 7.5 6.4
5.9 5.0 4.9 6.3 6.6 7.1 6.0 5.6 5.7 6.5 7.1 8.4 7.3 9.8 10.0 10.2 10.2 10.1 9.4 9.2 9.6 10.0 9.4 8.0 7.9 7.9 7.3 7.3 7.5 7.2 8.4 7.6 7.5 7.3 7.9 6.6
10.9 10.9 10.8 10.3 11.1 11.4 10.3 10.5 11.2 10.4 9.7 8.3 8.2 8.2 6.5
10.9 11.7 10.8 8.6 15.4 8.6 10.3 8.6

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15, NOAA-16 and NOAA-17.

Standard of comparison :Background field from UKMO global model.

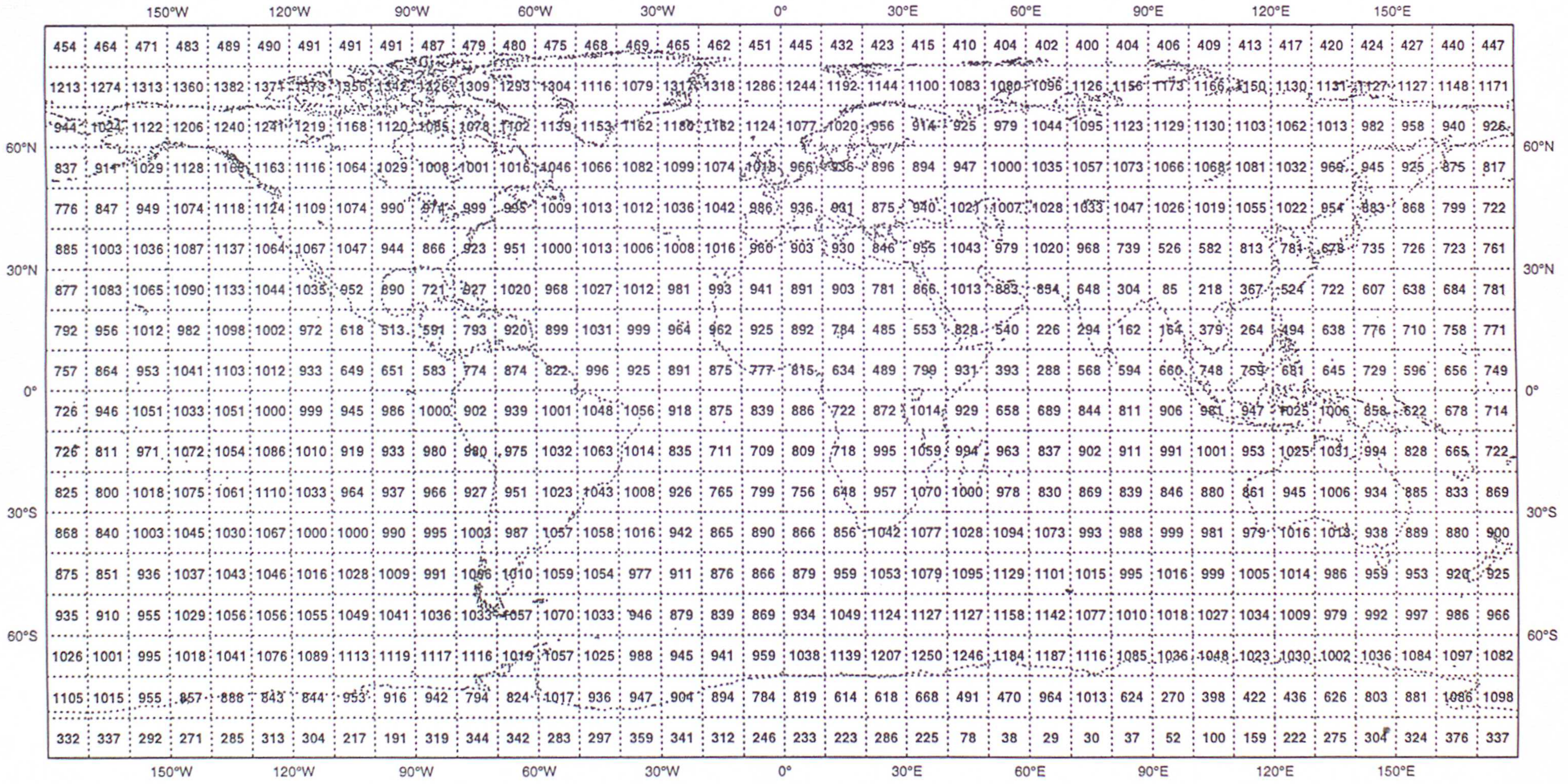
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

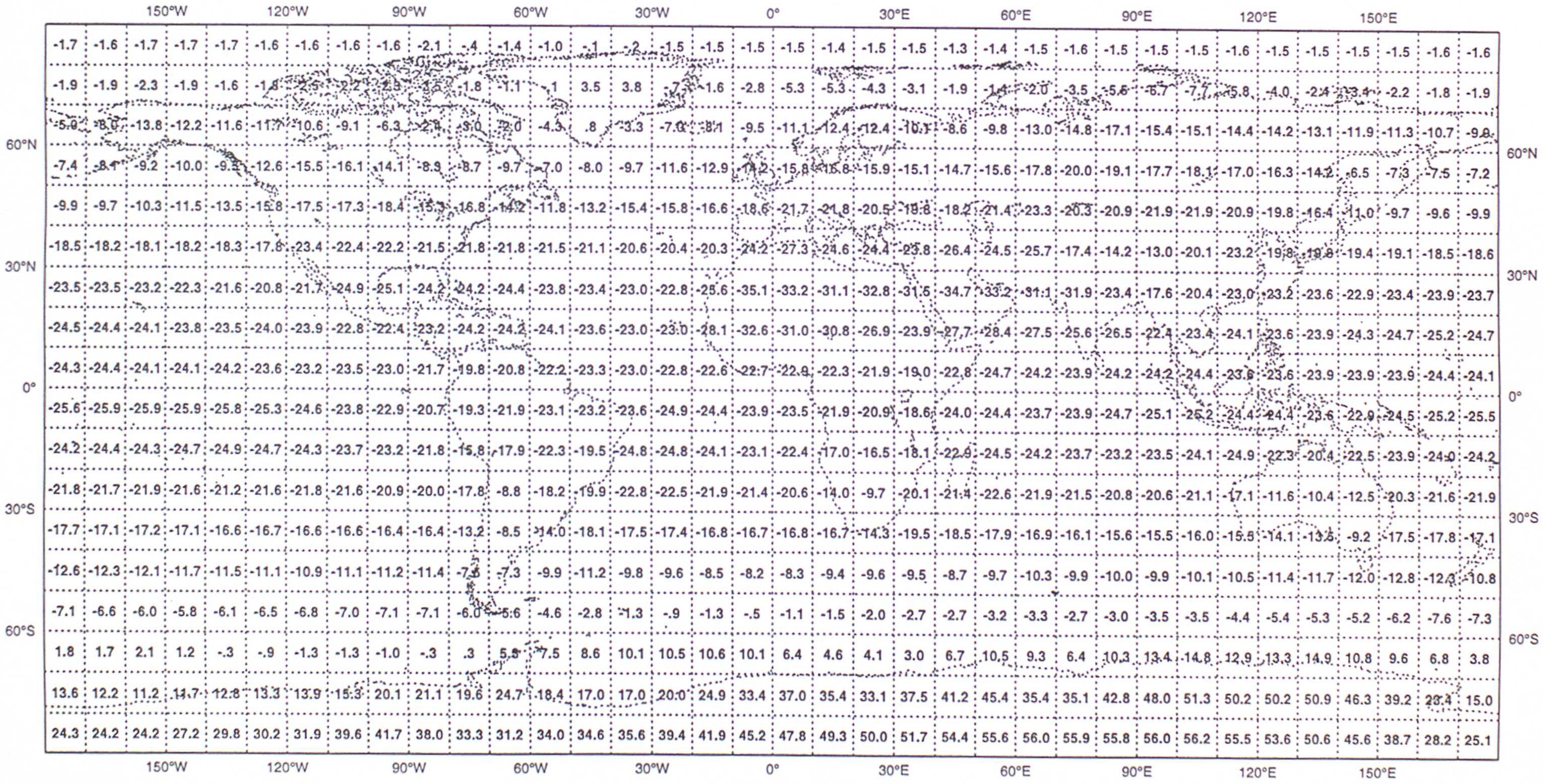
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. JUNE 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 568262



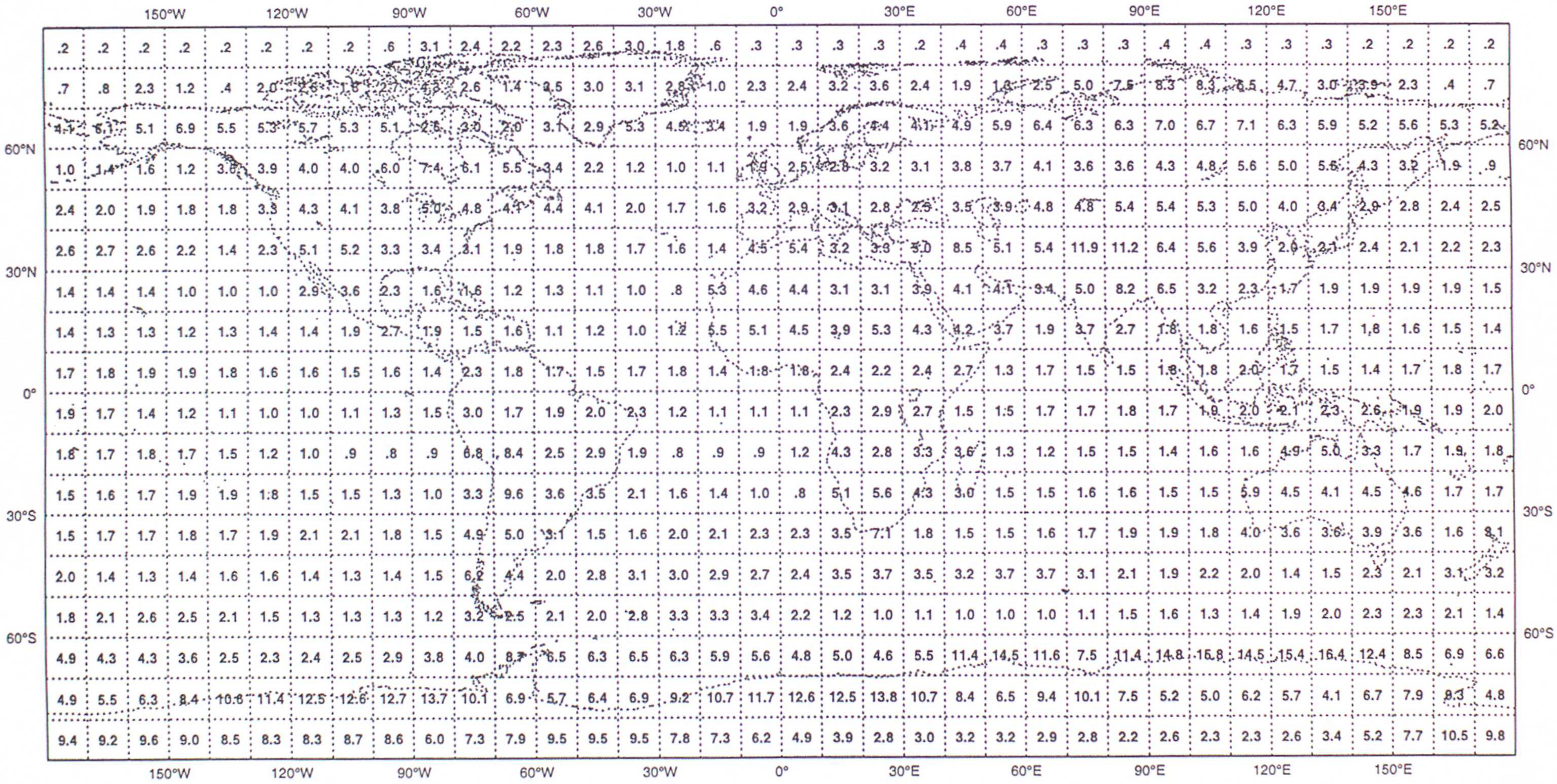
454	464	471	483	489	490	491	491	491	487	479	480	475	468	469	465	462	451	445	432	423	415	410	404	402	400	404	406	409	413	417	420	424	427	440	447
1213	1274	1313	1360	1382	1371	1373	1356	1342	1326	1309	1293	1304	1116	1079	1317	1318	1286	1244	1192	1144	1100	1083	1080	1096	1126	1156	1173	1166	1150	1130	1131	1127	1127	1148	1171
944	1024	1122	1206	1240	1241	1219	1168	1120	1085	1078	1102	1139	1153	1162	1180	1182	1124	1077	1020	956	914	925	979	1044	1095	1123	1129	1130	1103	1062	1013	982	958	940	926
837	914	1029	1128	1169	1163	1116	1064	1029	1008	1001	1016	1046	1066	1082	1099	1074	1018	966	936	896	894	947	1000	1035	1057	1073	1066	1068	1081	1032	969	945	925	875	817
776	847	949	1074	1118	1124	1109	1074	990	974	999	995	1009	1013	1012	1036	1042	986	936	931	875	940	1021	1007	1028	1033	1047	1026	1019	1055	1022	954	883	868	799	722
885	1003	1036	1087	1137	1064	1067	1047	944	866	923	951	1000	1013	1006	1008	1016	960	903	930	846	955	1043	979	1020	968	739	526	582	813	781	678	735	726	723	761
877	1083	1065	1090	1133	1044	1035	952	890	721	927	1020	968	1027	1012	981	993	941	891	903	781	866	1013	883	854	648	304	85	218	367	524	722	607	638	684	781
792	956	1012	982	1098	1002	972	618	513	591	793	920	899	1031	999	964	962	925	892	784	485	553	828	540	226	294	162	164	379	264	494	638	776	710	758	771
757	864	953	1041	1103	1012	933	649	651	583	774	874	822	996	925	891	875	777	815	634	489	799	931	393	288	568	594	660	748	759	681	645	729	596	656	749
726	946	1051	1033	1051	1000	999	945	986	1000	902	939	1001	1048	1056	918	875	839	886	722	872	1014	929	658	689	844	811	906	981	947	1025	1006	858	622	678	714
726	811	971	1072	1054	1086	1010	919	933	980	980	975	1032	1063	1014	835	711	709	809	718	995	1059	994	963	837	902	911	991	1001	953	1025	1031	994	828	665	722
825	800	1018	1075	1061	1110	1033	964	937	966	927	951	1023	1043	1008	926	765	799	756	648	957	1070	1000	978	830	869	839	846	880	861	945	1006	934	885	833	869
868	840	1003	1045	1030	1067	1000	1000	990	995	1003	987	1057	1058	1016	942	865	890	866	856	1042	1077	1028	1094	1073	993	988	999	981	979	1016	1013	938	889	880	900
875	851	936	1037	1043	1046	1016	1028	1009	991	1086	1010	1059	1054	977	911	876	866	879	959	1053	1079	1095	1129	1101	1015	995	1016	999	1005	1014	986	959	953	920	925
935	910	955	1029	1056	1056	1055	1049	1041	1036	1033	1057	1070	1033	946	879	839	869	934	1049	1124	1127	1127	1158	1142	1077	1010	1018	1027	1034	1009	979	992	997	986	966
1026	1001	995	1018	1041	1076	1089	1113	1119	1117	1116	1019	1057	1025	988	945	941	959	1038	1139	1207	1250	1246	1184	1187	1116	1085	1036	1048	1023	1030	1002	1036	1084	1097	1082
1105	1015	955	857	888	843	844	953	916	942	794	824	1017	936	947	904	894	784	819	614	618	668	491	470	964	1013	624	270	398	422	436	626	803	881	1086	1098
332	337	292	271	285	313	304	217	191	319	344	342	283	297	359	341	312	246	233	223	286	225	78	38	29	30	37	52	100	159	222	275	304	324	376	337

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



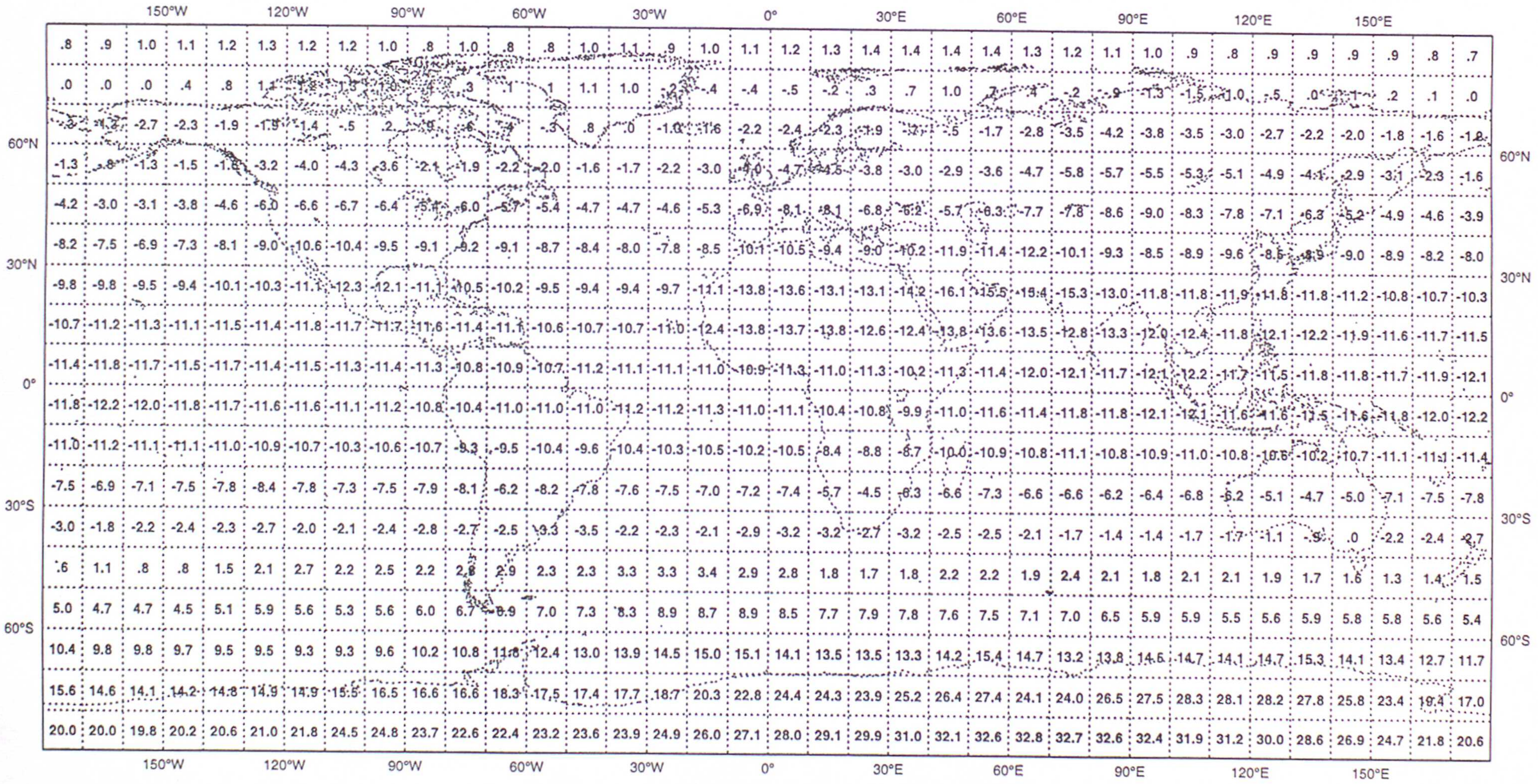
-1.7	-1.6	-1.7	-1.7	-1.7	-1.6	-1.6	-1.6	-1.6	-2.1	-.4	-1.4	-1.0	-.1	-.2	-1.5	-1.5	-1.5	-1.5	-1.4	-1.5	-1.5	-1.3	-1.4	-1.5	-1.6	-1.5	-1.5	-1.5	-1.6	-1.5	-1.5	-1.5	-1.5	-1.6	-1.6
-1.9	-1.9	-2.3	-1.9	-1.6	-1.8	-2.5	-2.2	-2.3	-3.5	-1.8	-1.1	-.1	3.5	3.8	-.7	-1.6	-2.8	-5.3	-5.3	-4.3	-3.1	-1.9	-1.4	-2.0	-3.5	-5.6	-6.7	-7.7	-5.8	-4.0	-2.4	-3.4	-2.2	-1.8	-1.9
-5.9	-8.0	-13.8	-12.2	-11.6	-11.7	-10.6	-9.1	-6.3	-2.4	-3.0	-2.0	-4.3	.8	-3.3	-7.0	-8.1	-9.5	-11.1	-12.4	-12.4	-10.1	-8.6	-9.8	-13.0	-14.8	-17.1	-15.4	-15.1	-14.4	-14.2	-13.1	-11.9	-11.3	-10.7	-9.8
-7.4	-8.4	-9.2	-10.0	-9.3	-12.6	-15.5	-16.1	-14.1	-8.9	-8.7	-9.7	-7.0	-8.0	-9.7	-11.6	-12.9	-14.2	-15.8	-15.8	-15.9	-15.1	-14.7	-15.6	-17.8	-20.0	-19.1	-17.7	-18.1	-17.0	-16.3	-14.2	-6.5	-7.3	-7.5	-7.2
-9.9	-9.7	-10.3	-11.5	-13.5	-15.8	-17.5	-17.3	-18.4	-15.3	-16.8	-14.2	-11.8	-13.2	-15.4	-15.8	-16.6	-18.6	-21.7	-21.8	-20.5	-19.8	-18.2	-21.4	-23.3	-20.3	-20.9	-21.9	-21.9	-20.9	-19.8	-16.4	-11.0	-9.7	-9.6	-9.9
-18.5	-18.2	-18.1	-18.2	-18.3	-17.8	-23.4	-22.4	-22.2	-21.5	-21.8	-21.8	-21.5	-21.1	-20.6	-20.4	-20.3	-24.2	-27.3	-24.6	-24.4	-23.8	-26.4	-24.5	-25.7	-17.4	-14.2	-13.0	-20.1	-23.2	-19.8	-19.8	-19.4	-19.1	-18.5	-18.6
-23.5	-23.5	-23.2	-22.3	-21.6	-20.8	-21.7	-24.9	-25.1	-24.2	-24.2	-24.4	-23.8	-23.4	-23.0	-22.8	-25.6	-35.1	-33.2	-31.1	-32.8	-31.5	-34.7	-33.2	-31.1	-31.9	-23.4	-17.6	-20.4	-23.0	-23.2	-23.6	-22.9	-23.4	-23.9	-23.7
-24.5	-24.4	-24.1	-23.8	-23.5	-24.0	-23.9	-22.8	-22.4	-23.2	-24.2	-24.2	-24.1	-23.6	-23.0	-23.0	-28.1	-32.6	-31.0	-30.8	-26.9	-23.9	-27.7	-28.4	-27.5	-25.6	-26.5	-22.4	-23.4	-24.1	-23.6	-23.9	-24.3	-24.7	-25.2	-24.7
-24.3	-24.4	-24.1	-24.1	-24.2	-23.6	-23.2	-23.5	-23.0	-21.7	-19.8	-20.8	-22.2	-23.3	-23.0	-22.8	-22.6	-22.7	-22.9	-22.3	-21.9	-19.0	-22.8	-24.7	-24.2	-23.9	-24.2	-24.2	-24.4	-23.6	-23.6	-23.9	-23.9	-23.9	-24.4	-24.1
-25.6	-25.9	-25.9	-25.9	-25.8	-25.3	-24.6	-23.8	-22.9	-20.7	-19.3	-21.9	-23.1	-23.2	-23.6	-24.9	-24.4	-23.9	-23.5	-21.9	-20.9	-18.6	-24.0	-24.4	-23.7	-23.9	-24.7	-25.1	-25.2	-24.4	-24.4	-23.6	-22.9	-24.5	-25.2	-25.5
-24.2	-24.4	-24.3	-24.7	-24.9	-24.7	-24.3	-23.7	-23.2	-21.8	-15.8	-17.9	-22.3	-19.5	-24.8	-24.8	-24.1	-23.1	-22.4	-17.0	-16.5	-18.1	-22.9	-24.5	-24.2	-23.7	-23.2	-23.5	-24.1	-24.9	-22.3	-20.4	-22.5	-23.9	-24.0	-24.2
-21.8	-21.7	-21.9	-21.6	-21.2	-21.6	-21.8	-21.6	-20.9	-20.0	-17.8	-8.8	-18.2	-19.9	-22.8	-22.5	-21.9	-21.4	-20.6	-14.0	-9.7	-20.1	-21.4	-22.6	-21.9	-21.5	-20.8	-20.6	-21.1	-17.1	-11.6	-10.4	-12.5	-20.3	-21.6	-21.9
-17.7	-17.1	-17.2	-17.1	-16.6	-16.7	-16.6	-16.6	-16.4	-16.4	-13.2	-8.5	-14.0	-18.1	-17.5	-17.4	-16.8	-16.7	-16.8	-16.7	-14.3	-19.5	-18.5	-17.9	-16.9	-16.1	-15.6	-15.5	-16.0	-15.5	-14.1	-13.6	-9.2	-17.5	-17.8	-17.1
-12.6	-12.3	-12.1	-11.7	-11.5	-11.1	-10.9	-11.1	-11.2	-11.4	-7.5	-7.3	-9.9	-11.2	-9.8	-9.6	-8.5	-8.2	-8.3	-9.4	-9.6	-9.5	-8.7	-9.7	-10.3	-9.9	-10.0	-9.9	-10.1	-10.5	-11.4	-11.7	-12.0	-12.8	-12.3	-10.8
-7.1	-6.6	-6.0	-5.8	-6.1	-6.5	-6.8	-7.0	-7.1	-7.1	-6.0	-5.6	-4.6	-2.8	-1.3	-.9	-1.3	-.5	-1.1	-1.5	-2.0	-2.7	-2.7	-3.2	-3.3	-2.7	-3.0	-3.5	-3.5	-4.4	-5.4	-5.3	-5.2	-6.2	-7.6	-7.3
1.8	1.7	2.1	1.2	-.3	-.9	-1.3	-1.3	-1.0	-.3	.3	5.5	7.5	8.6	10.1	10.5	10.6	10.1	6.4	4.6	4.1	3.0	6.7	10.5	9.3	6.4	10.3	13.4	14.8	12.9	13.3	14.9	10.8	9.6	6.8	3.8
13.6	12.2	11.2	14.7	12.8	13.3	13.9	15.3	20.1	21.1	19.6	24.7	18.4	17.0	17.0	20.0	24.9	33.4	37.0	35.4	33.1	37.5	41.2	45.4	35.4	35.1	42.8	48.0	51.3	50.2	50.2	50.9	46.3	39.2	28.4	15.0
24.3	24.2	24.2	27.2	29.8	30.2	31.9	39.6	41.7	38.0	33.3	31.2	34.0	34.6	35.6	39.4	41.9	45.2	47.8	49.3	50.0	51.7	54.4	55.6	56.0	55.9	55.8	56.0	56.2	55.5	53.6	50.6	45.6	38.7	28.2	25.1

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



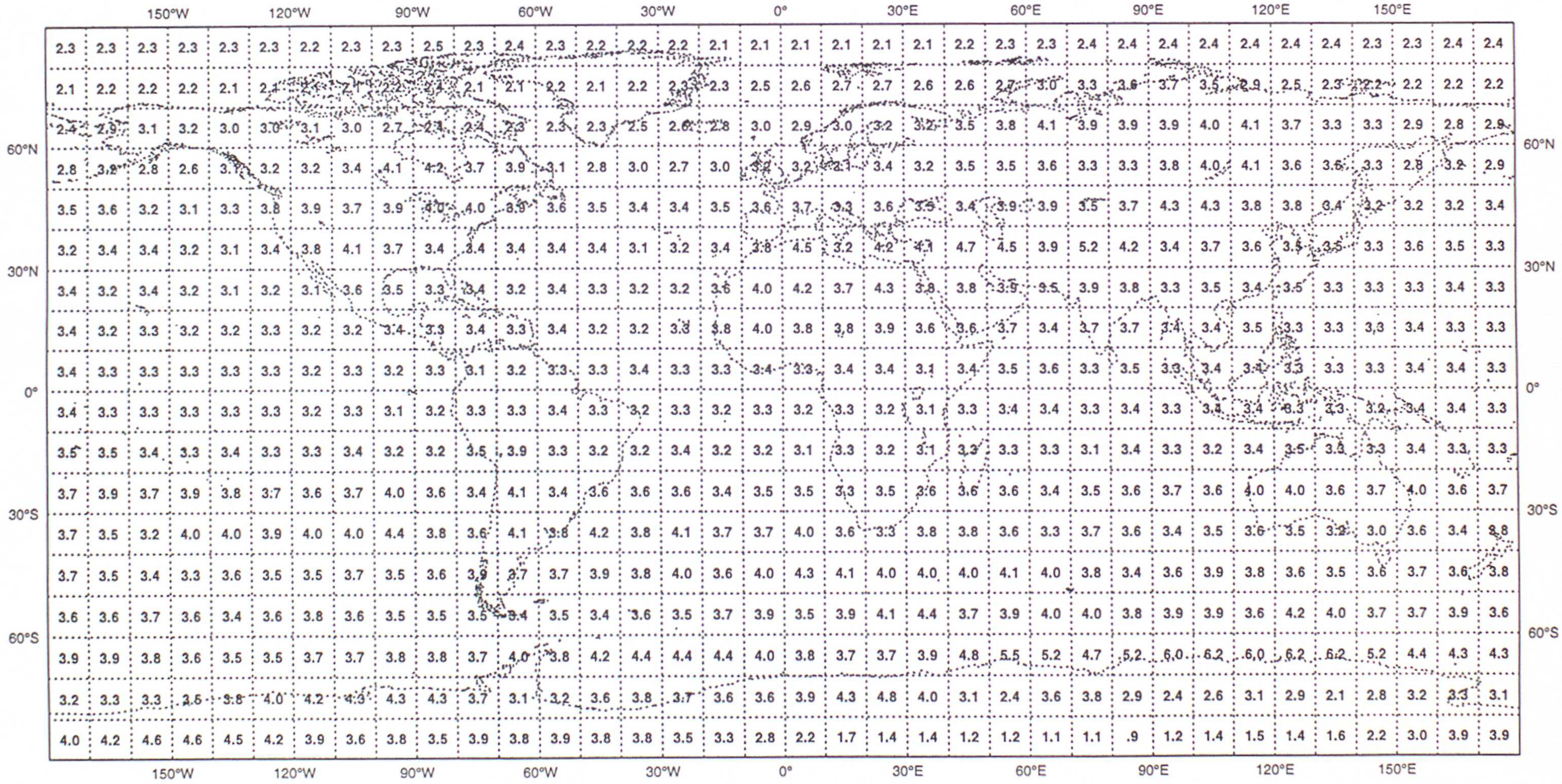
.2	.2	.2	.2	.2	.2	.2	.2	.6	3.1	2.4	2.2	2.3	2.6	3.0	1.8	.6	.3	.3	.3	.3	.2	.4	.4	.3	.3	.3	.4	.4	.3	.3	.3	.2	.2	.2	.2
.7	.8	2.3	1.2	.4	2.0	2.6	1.8	2.7	4.3	2.6	1.4	3.5	3.0	3.1	2.8	1.0	2.3	2.4	3.2	3.6	2.4	1.9	1.8	2.5	5.0	7.5	8.3	8.3	6.5	4.7	3.0	3.9	2.3	.4	.7
4.1	6.1	5.1	6.9	5.5	5.3	5.7	5.3	5.1	2.6	3.0	2.0	3.1	2.9	5.3	4.5	3.4	1.9	1.9	3.6	4.4	4.1	4.9	5.9	6.4	6.3	6.3	7.0	6.7	7.1	6.3	5.9	5.2	5.6	5.3	5.2
1.0	1.4	1.6	1.2	3.6	3.9	4.0	4.0	6.0	7.4	6.1	5.5	3.4	2.2	1.2	1.0	1.1	1.9	2.5	2.8	3.2	3.1	3.8	3.7	4.1	3.6	3.6	4.3	4.8	5.6	5.0	5.6	4.3	3.2	1.9	.9
2.4	2.0	1.9	1.8	1.8	3.3	4.3	4.1	3.8	5.0	4.8	4.1	4.4	4.1	2.0	1.7	1.6	3.2	2.9	3.1	2.8	2.5	3.5	3.9	4.8	4.8	5.4	5.4	5.3	5.0	4.0	3.4	2.9	2.8	2.4	2.5
2.6	2.7	2.6	2.2	1.4	2.3	5.1	5.2	3.3	3.4	3.1	1.9	1.8	1.8	1.7	1.6	1.4	4.5	5.4	3.2	3.3	5.0	8.5	5.1	5.4	11.9	11.2	6.4	5.6	3.9	2.0	2.1	2.4	2.1	2.2	2.3
1.4	1.4	1.4	1.0	1.0	1.0	2.9	3.6	2.3	1.6	1.6	1.2	1.3	1.1	1.0	.8	5.3	4.6	4.4	3.1	3.1	3.9	4.1	4.1	3.4	5.0	8.2	6.5	3.2	2.3	1.7	1.9	1.9	1.9	1.9	1.5
1.4	1.3	1.3	1.2	1.3	1.4	1.4	1.9	2.7	1.9	1.5	1.6	1.1	1.2	1.0	1.2	5.5	5.1	4.5	3.9	5.3	4.3	4.2	3.7	1.9	3.7	2.7	1.8	1.8	1.6	1.5	1.7	1.8	1.6	1.5	1.4
1.7	1.8	1.9	1.9	1.8	1.6	1.6	1.5	1.6	1.4	2.3	1.8	1.7	1.5	1.7	1.8	1.4	1.8	1.8	2.4	2.2	2.4	2.7	1.3	1.7	1.5	1.5	1.8	1.8	2.0	1.7	1.5	1.4	1.7	1.8	1.7
1.9	1.7	1.4	1.2	1.1	1.0	1.0	1.1	1.3	1.5	3.0	1.7	1.9	2.0	2.3	1.2	1.1	1.1	1.1	2.3	2.9	2.7	1.5	1.5	1.7	1.7	1.8	1.7	1.9	2.0	2.1	2.3	2.6	1.9	1.9	2.0
1.8	1.7	1.8	1.7	1.5	1.2	1.0	.9	.8	.9	6.8	8.4	2.5	2.9	1.9	.8	.9	.9	1.2	4.3	2.8	3.3	3.6	1.3	1.2	1.5	1.5	1.4	1.6	1.6	4.9	5.0	3.3	1.7	1.9	1.8
1.5	1.6	1.7	1.9	1.9	1.8	1.5	1.5	1.3	1.0	3.3	9.6	3.6	3.5	2.1	1.6	1.4	1.0	.8	5.1	5.6	4.3	3.0	1.5	1.5	1.6	1.6	1.5	1.5	5.9	4.5	4.1	4.5	4.6	1.7	1.7
1.5	1.7	1.7	1.8	1.7	1.9	2.1	2.1	1.8	1.5	4.9	5.0	3.1	1.5	1.6	2.0	2.1	2.3	2.3	3.5	7.1	1.8	1.5	1.5	1.6	1.7	1.9	1.9	1.8	4.0	3.6	3.6	3.9	3.6	1.6	8.1
2.0	1.4	1.3	1.4	1.6	1.6	1.4	1.3	1.4	1.5	6.2	4.4	2.0	2.8	3.1	3.0	2.9	2.7	2.4	3.5	3.7	3.5	3.2	3.7	3.7	3.1	2.1	1.9	2.2	2.0	1.4	1.5	2.3	2.1	3.1	3.2
1.8	2.1	2.6	2.5	2.1	1.5	1.3	1.3	1.3	1.2	3.2	2.5	2.1	2.0	2.8	3.3	3.3	3.4	2.2	1.2	1.0	1.1	1.0	1.0	1.0	1.1	1.5	1.6	1.3	1.4	1.9	2.0	2.3	2.3	2.1	1.4
4.9	4.3	4.3	3.6	2.5	2.3	2.4	2.5	2.9	3.8	4.0	8.7	6.5	6.3	6.5	6.3	5.9	5.6	4.8	5.0	4.6	5.5	11.4	14.5	11.6	7.5	11.4	14.8	16.8	14.5	15.4	16.4	12.4	8.5	6.9	6.6
4.9	5.5	6.3	8.4	10.8	11.4	12.5	12.6	12.7	13.7	10.1	6.9	5.7	6.4	6.9	9.2	10.7	11.7	12.6	12.5	13.8	10.7	8.4	6.5	9.4	10.1	7.5	5.2	5.0	6.2	5.7	4.1	6.7	7.9	8.3	4.8
9.4	9.2	9.6	9.0	8.5	8.3	8.3	8.7	8.6	6.0	7.3	7.9	9.5	9.5	9.5	7.8	7.3	6.2	4.9	3.9	2.8	3.0	3.2	3.2	2.9	2.8	2.2	2.6	2.3	2.3	2.6	3.4	5.2	7.7	10.5	9.8

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



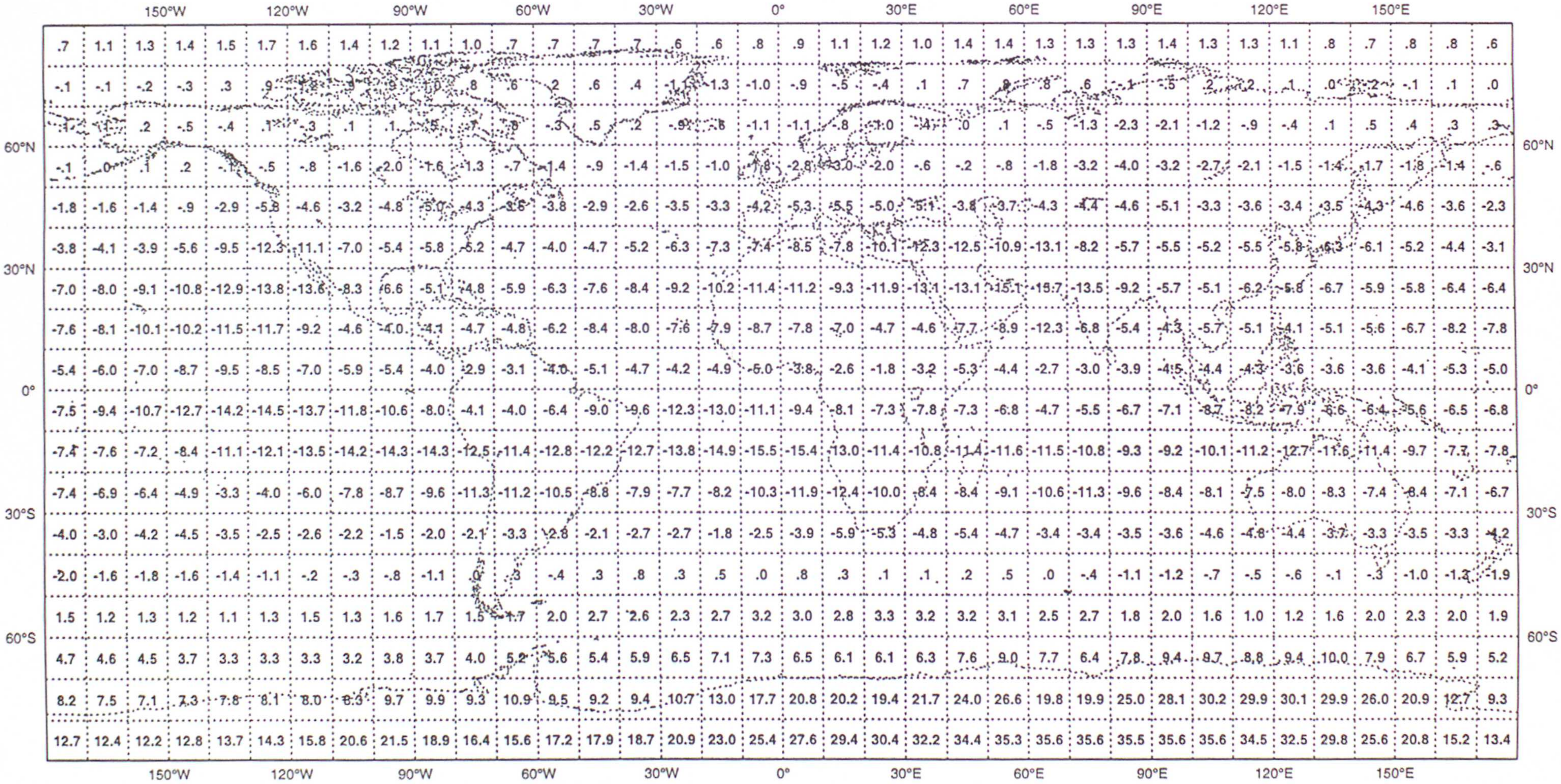
.8	.9	1.0	1.1	1.2	1.3	1.2	1.2	1.0	.8	1.0	.8	.8	1.0	1.1	.9	1.0	1.1	1.2	1.3	1.4	1.4	1.4	1.4	1.3	1.2	1.1	1.0	.9	.8	.9	.9	.9	.9	.8	.7
.0	.0	.0	.4	.8	1.1	1.8	1.3	1.0	.4	.3	.1	.1	1.1	1.0	-.2	-.4	-.4	-.5	-.2	.3	.7	1.0	.7	.4	-.2	-.9	-1.3	-1.5	-1.0	-.5	.0	.1	.2	.1	.0
-.3	-1.2	-2.7	-2.3	-1.9	-1.9	-1.4	-.5	.2	-.9	-.6	-.4	-.3	.8	.0	-1.0	-1.6	-2.2	-2.4	-2.3	-1.9	-.7	-.5	-1.7	-2.8	-3.5	-4.2	-3.8	-3.5	-3.0	-2.7	-2.2	-2.0	-1.8	-1.6	-1.8
-1.3	-.8	-1.3	-1.5	-1.8	-3.2	-4.0	-4.3	-3.6	-2.1	-1.9	-2.2	-2.0	-1.6	-1.7	-2.2	-3.0	-4.0	-4.7	-4.5	-3.8	-3.0	-2.9	-3.6	-4.7	-5.8	-5.7	-5.5	-5.3	-5.1	-4.9	-4.1	-2.9	-3.1	-2.3	-1.6
-4.2	-3.0	-3.1	-3.8	-4.6	-6.0	-6.6	-6.7	-6.4	-5.4	-6.0	-5.7	-5.4	-4.7	-4.7	-4.6	-5.3	-6.9	-8.1	-8.1	-6.8	-6.2	-5.7	-6.3	-7.7	-7.8	-8.6	-9.0	-8.3	-7.8	-7.1	-6.3	-5.2	-4.9	-4.6	-3.9
-8.2	-7.5	-6.9	-7.3	-8.1	-9.0	-10.6	-10.4	-9.5	-9.1	-9.2	-9.1	-8.7	-8.4	-8.0	-7.8	-8.5	-10.1	-10.5	-9.4	-9.0	-10.2	-11.9	-11.4	-12.2	-10.1	-9.3	-8.5	-8.9	-9.6	-8.5	-8.9	-9.0	-8.9	-8.2	-8.0
-9.8	-9.8	-9.5	-9.4	-10.1	-10.3	-11.1	-12.3	-12.1	-11.1	-10.5	-10.2	-9.5	-9.4	-9.4	-9.7	-11.1	-13.8	-13.6	-13.1	-13.1	-14.2	-16.1	-15.5	-15.4	-15.3	-13.0	-11.8	-11.8	-11.9	-11.8	-11.8	-11.2	-10.8	-10.7	-10.3
-10.7	-11.2	-11.3	-11.1	-11.5	-11.4	-11.8	-11.7	-11.7	-11.6	-11.4	-11.1	-10.6	-10.7	-10.7	-11.0	-12.4	-13.8	-13.7	-13.8	-12.6	-12.4	-13.8	-13.6	-13.5	-12.8	-13.3	-12.0	-12.4	-11.8	-12.1	-12.2	-11.9	-11.6	-11.7	-11.5
-11.4	-11.8	-11.7	-11.5	-11.7	-11.4	-11.5	-11.3	-11.4	-11.3	-10.8	-10.9	-10.7	-11.2	-11.1	-11.1	-11.0	-10.9	-11.3	-11.0	-11.3	-10.2	-11.3	-11.4	-12.0	-12.1	-11.7	-12.1	-12.2	-11.7	-11.5	-11.8	-11.8	-11.7	-11.9	-12.1
-11.8	-12.2	-12.0	-11.8	-11.7	-11.6	-11.6	-11.1	-11.2	-10.8	-10.4	-11.0	-11.0	-11.0	-11.2	-11.2	-11.3	-11.0	-11.1	-10.4	-10.8	-9.9	-11.0	-11.6	-11.4	-11.8	-11.8	-12.1	-12.1	-11.6	-11.6	-11.5	-11.6	-11.8	-12.0	-12.2
-11.0	-11.2	-11.1	-11.1	-11.0	-10.9	-10.7	-10.3	-10.6	-10.7	-9.3	-9.5	-10.4	-9.6	-10.4	-10.3	-10.5	-10.2	-10.5	-8.4	-8.8	-8.7	-10.0	-10.9	-10.8	-11.1	-10.8	-10.9	-11.0	-10.8	-10.6	-10.2	-10.7	-11.1	-11.1	-11.4
-7.5	-6.9	-7.1	-7.5	-7.8	-8.4	-7.8	-7.3	-7.5	-7.9	-8.1	-6.2	-8.2	-7.8	-7.6	-7.5	-7.0	-7.2	-7.4	-5.7	-4.5	-6.3	-6.6	-7.3	-6.6	-6.6	-6.2	-6.4	-6.8	-6.2	-5.1	-4.7	-5.0	-7.1	-7.5	-7.8
-3.0	-1.8	-2.2	-2.4	-2.3	-2.7	-2.0	-2.1	-2.4	-2.8	-2.7	-2.5	-3.3	-3.5	-2.2	-2.3	-2.1	-2.9	-3.2	-3.2	-2.7	-3.2	-2.5	-2.5	-2.1	-1.7	-1.4	-1.4	-1.7	-1.7	-1.1	-.9	.0	-2.2	-2.4	-2.7
.6	1.1	.8	.8	1.5	2.1	2.7	2.2	2.5	2.2	2.8	2.9	2.3	2.3	3.3	3.3	3.4	2.9	2.8	1.8	1.7	1.8	2.2	2.2	1.9	2.4	2.1	1.8	2.1	2.1	1.9	1.7	1.6	1.3	1.4	1.5
5.0	4.7	4.7	4.5	5.1	5.9	5.6	5.3	5.6	6.0	6.7	6.9	7.0	7.3	8.3	8.9	8.7	8.9	8.5	7.7	7.9	7.8	7.6	7.5	7.1	7.0	6.5	5.9	5.9	5.5	5.6	5.9	5.8	5.8	5.6	5.4
10.4	9.8	9.8	9.7	9.5	9.5	9.3	9.3	9.6	10.2	10.8	11.8	12.4	13.0	13.9	14.5	15.0	15.1	14.1	13.5	13.5	13.3	14.2	15.4	14.7	13.2	13.8	14.6	14.7	14.1	14.7	15.3	14.1	13.4	12.7	11.7
15.6	14.6	14.1	14.2	14.8	14.9	14.9	15.5	16.5	16.6	16.6	18.3	17.5	17.4	17.7	18.7	20.3	22.8	24.4	24.3	23.9	25.2	26.4	27.4	24.1	24.0	26.5	27.5	28.3	28.1	28.2	27.8	25.8	23.4	19.4	17.0
20.0	20.0	19.8	20.2	20.6	21.0	21.8	24.5	24.8	23.7	22.6	22.4	23.2	23.6	23.9	24.9	26.0	27.1	28.0	29.1	29.9	31.0	32.1	32.6	32.8	32.7	32.6	32.4	31.9	31.2	30.0	28.6	26.9	24.7	21.8	20.6

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



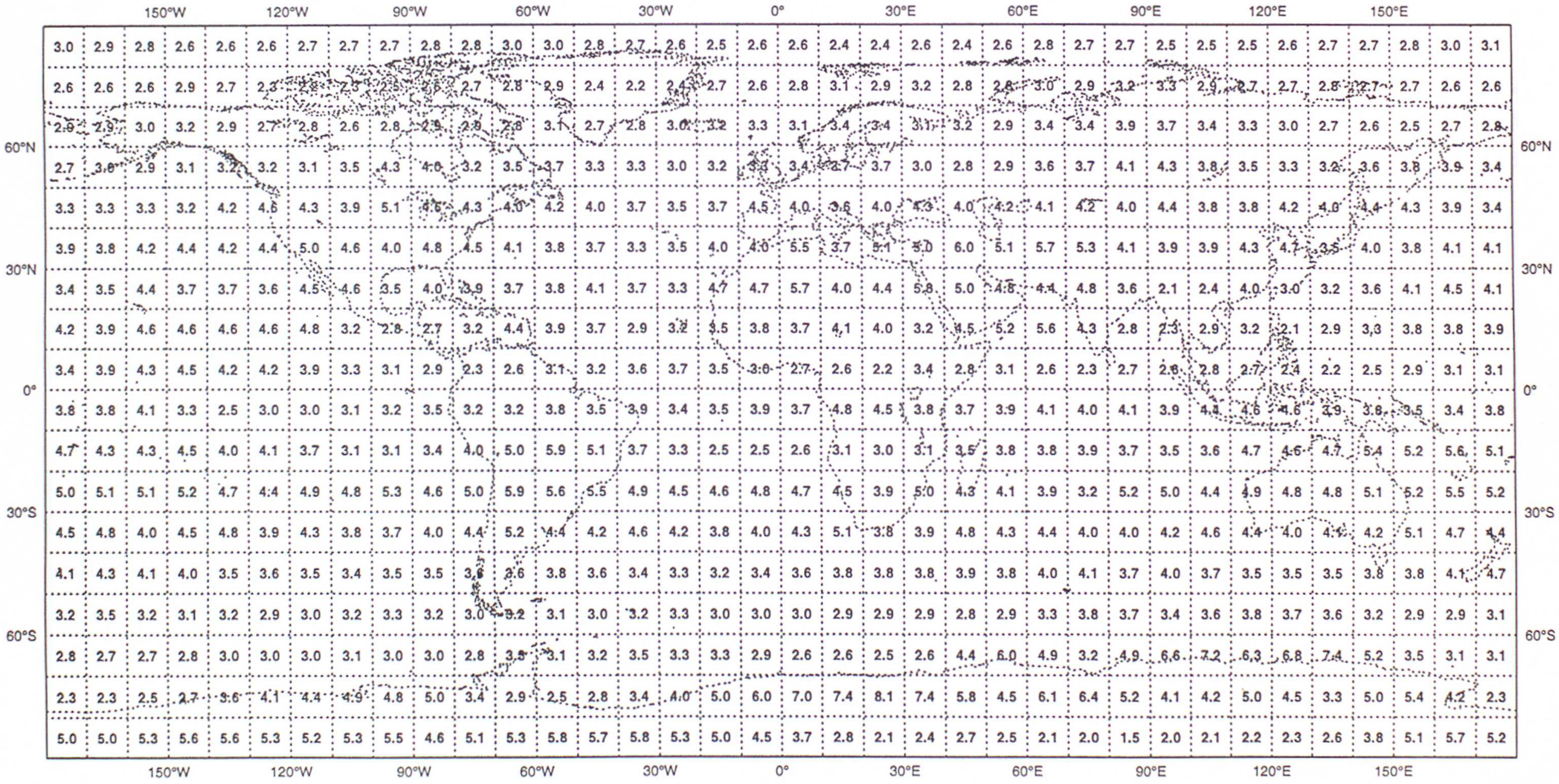
2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.5	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.4
2.1	2.2	2.2	2.2	2.1	2.4	2.4	2.1	2.2	2.4	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.5	2.6	2.7	2.7	2.6	2.6	2.7	3.0	3.3	3.6	3.7	3.5	2.9	2.5	2.3	2.2	2.2	2.2	2.2
2.4	2.9	3.1	3.2	3.0	3.0	3.1	3.0	2.7	2.4	2.4	2.3	2.3	2.3	2.5	2.6	2.8	3.0	2.9	3.0	3.2	3.2	3.5	3.8	4.1	3.9	3.9	3.9	4.0	4.1	3.7	3.3	3.3	2.9	2.8	2.9
2.8	3.2	2.8	2.6	3.1	3.2	3.2	3.4	4.1	4.2	3.7	3.9	3.1	2.8	3.0	2.7	3.0	3.2	3.2	2.1	3.4	3.2	3.5	3.5	3.6	3.3	3.3	3.8	4.0	4.1	3.6	3.6	3.3	2.8	3.2	2.9
3.5	3.6	3.2	3.1	3.3	3.8	3.9	3.7	3.9	4.0	4.0	3.9	3.6	3.5	3.4	3.4	3.5	3.6	3.7	3.3	3.6	3.5	3.4	3.9	3.9	3.5	3.7	4.3	4.3	3.8	3.8	3.4	3.2	3.2	3.2	3.4
3.2	3.4	3.4	3.2	3.1	3.4	3.8	4.1	3.7	3.4	3.4	3.4	3.4	3.4	3.1	3.2	3.4	3.8	4.5	3.2	4.2	4.1	4.7	4.5	3.9	5.2	4.2	3.4	3.7	3.6	3.5	3.5	3.3	3.6	3.5	3.3
3.4	3.2	3.4	3.2	3.1	3.2	3.1	3.6	3.5	3.3	3.4	3.2	3.4	3.3	3.2	3.2	3.6	4.0	4.2	3.7	4.3	3.8	3.8	3.9	3.5	3.9	3.8	3.3	3.5	3.4	3.5	3.3	3.3	3.3	3.4	3.3
3.4	3.2	3.3	3.2	3.2	3.3	3.2	3.2	3.4	3.3	3.4	3.3	3.4	3.2	3.2	3.3	3.8	4.0	3.8	3.8	3.9	3.6	3.6	3.7	3.4	3.7	3.7	3.4	3.4	3.5	3.3	3.3	3.3	3.4	3.3	3.3
3.4	3.3	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.3	3.1	3.2	3.3	3.3	3.4	3.3	3.3	3.4	3.3	3.4	3.4	3.1	3.4	3.5	3.6	3.3	3.5	3.3	3.4	3.4	3.3	3.3	3.3	3.4	3.4	3.3
3.4	3.3	3.3	3.3	3.3	3.3	3.2	3.3	3.1	3.2	3.3	3.3	3.4	3.3	3.2	3.3	3.2	3.3	3.2	3.3	3.2	3.1	3.3	3.4	3.4	3.3	3.4	3.3	3.4	3.4	3.3	3.3	3.2	3.4	3.4	3.3
3.5	3.5	3.4	3.3	3.4	3.3	3.3	3.4	3.2	3.2	3.5	3.9	3.3	3.2	3.2	3.4	3.2	3.2	3.1	3.3	3.2	3.1	3.3	3.3	3.3	3.1	3.4	3.3	3.2	3.4	3.5	3.3	3.3	3.4	3.3	3.3
3.7	3.9	3.7	3.9	3.8	3.7	3.6	3.7	4.0	3.6	3.4	4.1	3.4	3.6	3.6	3.6	3.4	3.5	3.5	3.3	3.5	3.6	3.6	3.6	3.4	3.5	3.6	3.7	3.6	4.0	4.0	3.6	3.7	4.0	3.6	3.7
3.7	3.5	3.2	4.0	4.0	3.9	4.0	4.0	4.4	3.8	3.6	4.1	3.8	4.2	3.8	4.1	3.7	3.7	4.0	3.6	3.3	3.8	3.8	3.6	3.3	3.7	3.6	3.4	3.5	3.6	3.5	3.2	3.0	3.6	3.4	3.8
3.7	3.5	3.4	3.3	3.6	3.5	3.5	3.7	3.5	3.6	3.9	3.7	3.7	3.9	3.8	4.0	3.6	4.0	4.3	4.1	4.0	4.0	4.0	4.1	4.0	3.8	3.4	3.6	3.9	3.8	3.6	3.5	3.6	3.7	3.6	3.8
3.6	3.6	3.7	3.6	3.4	3.6	3.8	3.6	3.5	3.5	3.5	3.4	3.5	3.4	3.6	3.5	3.7	3.9	3.5	3.9	4.1	4.4	3.7	3.9	4.0	4.0	3.8	3.9	3.9	3.6	4.2	4.0	3.7	3.7	3.9	3.6
3.9	3.9	3.8	3.6	3.5	3.5	3.7	3.7	3.8	3.8	3.7	4.0	3.8	4.2	4.4	4.4	4.4	4.0	3.8	3.7	3.7	3.9	4.8	5.5	5.2	4.7	5.2	6.0	6.2	6.0	6.2	6.2	5.2	4.4	4.3	4.3
3.2	3.3	3.3	3.5	3.8	4.0	4.2	4.3	4.3	4.3	3.7	3.1	3.2	3.6	3.8	3.7	3.6	3.6	3.9	4.3	4.8	4.0	3.1	2.4	3.6	3.8	2.9	2.4	2.6	3.1	2.9	2.1	2.8	3.2	3.3	3.1
4.0	4.2	4.6	4.6	4.5	4.2	3.9	3.6	3.8	3.5	3.9	3.8	3.9	3.8	3.8	3.5	3.3	2.8	2.2	1.7	1.4	1.4	1.2	1.2	1.1	1.1	.9	1.2	1.4	1.5	1.4	1.6	2.2	3.0	3.9	3.9

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



.7	1.1	1.3	1.4	1.5	1.7	1.6	1.4	1.2	1.1	1.0	.7	.7	.7	.7	.6	.6	.8	.9	1.1	1.2	1.0	1.4	1.4	1.3	1.3	1.3	1.4	1.3	1.3	1.1	.8	.7	.8	.8	.6
-.1	-.1	-.2	-.3	.3	.9	1.2	.9	.9	1.0	.8	.6	.2	.6	.4	-1.1	-1.3	-1.0	-.9	-.5	-.4	.1	.7	.8	.8	.6	-.1	-.5	.2	.2	.1	.0	-.2	-.1	.1	.0
.1	.1	.2	-.5	-.4	.1	-.3	.1	.1	.5	.7	.8	-.3	.5	.2	-.9	-.6	-1.1	-1.1	-.8	-1.0	-.4	.0	.1	-.5	-1.3	-2.3	-2.1	-1.2	-.9	-.4	.1	.5	.4	.3	.3
-.1	.0	.1	.2	-.1	-.5	-.8	-1.6	-2.0	-1.6	-1.3	-.7	-1.4	-.9	-1.4	-1.5	-1.0	-1.8	-2.8	-3.0	-2.0	-.6	-.2	-.8	-1.8	-3.2	-4.0	-3.2	-2.7	-2.1	-1.5	-1.4	-1.7	-1.8	-1.4	-.6
-1.8	-1.6	-1.4	-.9	-2.9	-5.8	-4.6	-3.2	-4.8	-5.0	-4.3	-3.6	-3.8	-2.9	-2.6	-3.5	-3.3	-4.2	-5.3	-5.5	-5.0	-5.1	-3.8	-3.7	-4.3	-4.4	-4.6	-5.1	-3.3	-3.6	-3.4	-3.5	-4.3	-4.6	-3.6	-2.3
-3.8	-4.1	-3.9	-5.6	-9.5	-12.3	-11.1	-7.0	-5.4	-5.8	-5.2	-4.7	-4.0	-4.7	-5.2	-6.3	-7.3	-7.4	-8.5	-7.8	-10.1	-12.3	-12.5	-10.9	-13.1	-8.2	-5.7	-5.5	-5.2	-5.5	-5.8	-6.3	-6.1	-5.2	-4.4	-3.1
-7.0	-8.0	-9.1	-10.8	-12.9	-13.8	-13.6	-8.3	-6.6	-5.1	-4.8	-5.9	-6.3	-7.6	-8.4	-9.2	-10.2	-11.4	-11.2	-9.3	-11.9	-13.1	-13.1	-15.1	-15.7	-13.5	-9.2	-5.7	-5.1	-6.2	-5.8	-6.7	-5.9	-5.8	-6.4	-6.4
-7.6	-8.1	-10.1	-10.2	-11.5	-11.7	-9.2	-4.6	-4.0	-4.1	-4.7	-4.8	-6.2	-8.4	-8.0	-7.6	-7.9	-8.7	-7.8	-7.0	-4.7	-4.6	-7.7	-8.9	-12.3	-6.8	-5.4	-4.3	-5.7	-5.1	-4.1	-5.1	-5.6	-6.7	-8.2	-7.8
-5.4	-6.0	-7.0	-8.7	-9.5	-8.5	-7.0	-5.9	-5.4	-4.0	-2.9	-3.1	-4.0	-5.1	-4.7	-4.2	-4.9	-6.0	-3.8	-2.6	-1.8	-3.2	-5.3	-4.4	-2.7	-3.0	-3.9	-4.5	-4.4	-4.3	-3.6	-3.6	-3.6	-4.1	-5.3	-5.0
-7.5	-9.4	-10.7	-12.7	-14.2	-14.5	-13.7	-11.8	-10.6	-8.0	-4.1	-4.0	-6.4	-9.0	-9.6	-12.3	-13.0	-11.1	-9.4	-8.1	-7.3	-7.8	-7.3	-6.8	-4.7	-5.5	-6.7	-7.1	-8.7	-8.2	-7.9	-6.6	-6.4	-5.6	-6.5	-6.8
-7.4	-7.6	-7.2	-8.4	-11.1	-12.1	-13.5	-14.2	-14.3	-14.3	-12.5	-11.4	-12.8	-12.2	-12.7	-13.8	-14.9	-15.5	-15.4	-13.0	-11.4	-10.8	-11.4	-11.6	-11.5	-10.8	-9.3	-9.2	-10.1	-11.2	-12.7	-11.6	-11.4	-9.7	-7.7	-7.8
-7.4	-6.9	-6.4	-4.9	-3.3	-4.0	-6.0	-7.8	-8.7	-9.6	-11.3	-11.2	-10.5	-8.8	-7.9	-7.7	-8.2	-10.3	-11.9	-12.4	-10.0	-8.4	-8.4	-9.1	-10.6	-11.3	-9.6	-8.4	-8.1	-7.5	-8.0	-8.3	-7.4	-8.4	-7.1	-6.7
-4.0	-3.0	-4.2	-4.5	-3.5	-2.5	-2.6	-2.2	-1.5	-2.0	-2.1	-3.3	-2.8	-2.1	-2.7	-2.7	-1.8	-2.5	-3.9	-5.9	-5.3	-4.8	-5.4	-4.7	-3.4	-3.4	-3.5	-3.6	-4.6	-4.8	-4.4	-3.7	-3.3	-3.5	-3.3	-4.2
-2.0	-1.6	-1.8	-1.6	-1.4	-1.1	-.2	-.3	-.8	-1.1	.0	.3	-.4	.3	.8	.3	.5	.0	.8	.3	.1	.1	.2	.5	.0	-.4	-1.1	-1.2	-.7	-.5	-.6	-.1	-.3	-1.0	-1.3	-1.9
1.5	1.2	1.3	1.2	1.1	1.3	1.5	1.3	1.6	1.7	1.5	1.7	2.0	2.7	2.6	2.3	2.7	3.2	3.0	2.8	3.3	3.2	3.2	3.1	2.5	2.7	1.8	2.0	1.6	1.0	1.2	1.6	2.0	2.3	2.0	1.9
4.7	4.6	4.5	3.7	3.3	3.3	3.3	3.2	3.8	3.7	4.0	5.2	5.6	5.4	5.9	6.5	7.1	7.3	6.5	6.1	6.1	6.3	7.6	9.0	7.7	6.4	7.8	9.4	9.7	8.8	9.4	10.0	7.9	6.7	5.9	5.2
8.2	7.5	7.1	7.3	7.8	8.1	8.0	8.3	9.7	9.9	9.3	10.9	9.5	9.2	9.4	10.7	13.0	17.7	20.8	20.2	19.4	21.7	24.0	26.6	19.8	19.9	25.0	28.1	30.2	29.9	30.1	29.9	26.0	20.9	12.7	9.3
12.7	12.4	12.2	12.8	13.7	14.3	15.8	20.6	21.5	18.9	16.4	15.6	17.2	17.9	18.7	20.9	23.0	25.4	27.6	29.4	30.4	32.2	34.4	35.3	35.6	35.6	35.5	35.6	35.6	34.5	32.5	29.8	25.6	20.8	15.2	13.4

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



3.0	2.9	2.8	2.6	2.6	2.6	2.7	2.7	2.7	2.8	2.8	3.0	3.0	2.8	2.7	2.6	2.5	2.6	2.6	2.4	2.4	2.6	2.4	2.6	2.8	2.7	2.7	2.5	2.5	2.5	2.6	2.7	2.7	2.8	3.0	3.1
2.6	2.6	2.6	2.9	2.7	2.3	2.8	2.3	2.5	2.6	2.7	2.8	2.9	2.4	2.2	2.4	2.7	2.6	2.8	3.1	2.9	3.2	2.8	2.8	3.0	2.9	3.2	3.3	2.9	2.7	2.7	2.8	2.7	2.7	2.6	2.6
2.9	2.9	3.0	3.2	2.9	2.7	2.8	2.6	2.8	2.9	2.9	2.8	3.1	2.7	2.8	3.0	3.2	3.3	3.1	3.4	3.4	3.1	3.2	2.9	3.4	3.4	3.9	3.7	3.4	3.3	3.0	2.7	2.6	2.5	2.7	2.8
2.7	3.0	2.9	3.1	3.2	3.2	3.1	3.5	4.3	4.0	3.2	3.5	3.7	3.3	3.3	3.0	3.2	3.3	3.4	2.7	3.7	3.0	2.8	2.9	3.6	3.7	4.1	4.3	3.8	3.5	3.3	3.2	3.6	3.8	3.9	3.4
3.3	3.3	3.3	3.2	4.2	4.6	4.3	3.9	5.1	4.6	4.3	4.0	4.2	4.0	3.7	3.5	3.7	4.5	4.0	3.6	4.0	4.3	4.0	4.2	4.1	4.2	4.0	4.4	3.8	3.8	4.2	4.0	4.4	4.3	3.9	3.4
3.9	3.8	4.2	4.4	4.2	4.4	5.0	4.6	4.0	4.8	4.5	4.1	3.8	3.7	3.3	3.5	4.0	4.0	5.5	3.7	5.1	5.0	6.0	5.1	5.7	5.3	4.1	3.9	3.9	4.3	4.7	3.5	4.0	3.8	4.1	4.1
3.4	3.5	4.4	3.7	3.7	3.6	4.5	4.6	3.5	4.0	3.9	3.7	3.8	4.1	3.7	3.3	4.7	4.7	5.7	4.0	4.4	5.8	5.0	4.8	4.4	4.8	3.6	2.1	2.4	4.0	3.0	3.2	3.6	4.1	4.5	4.1
4.2	3.9	4.6	4.6	4.6	4.6	4.8	3.2	2.8	2.7	3.2	4.4	3.9	3.7	2.9	3.2	3.5	3.8	3.7	4.1	4.0	3.2	4.5	5.2	5.6	4.3	2.8	2.3	2.9	3.2	2.1	2.9	3.3	3.8	3.8	3.9
3.4	3.9	4.3	4.5	4.2	4.2	3.9	3.3	3.1	2.9	2.3	2.6	3.1	3.2	3.6	3.7	3.5	3.0	2.7	2.6	2.2	3.4	2.8	3.1	2.6	2.3	2.7	2.8	2.8	2.7	2.4	2.2	2.5	2.9	3.1	3.1
3.8	3.8	4.1	3.3	2.5	3.0	3.0	3.1	3.2	3.5	3.2	3.2	3.8	3.5	3.9	3.4	3.5	3.9	3.7	4.8	4.5	3.8	3.7	3.9	4.1	4.0	4.1	3.9	4.4	4.6	4.6	3.9	3.8	3.5	3.4	3.8
4.7	4.3	4.3	4.5	4.0	4.1	3.7	3.1	3.1	3.4	4.0	5.0	5.9	5.1	3.7	3.3	2.5	2.5	2.6	3.1	3.0	3.1	3.5	3.8	3.8	3.9	3.7	3.5	3.6	4.7	4.6	4.7	5.4	5.2	5.6	5.1
5.0	5.1	5.1	5.2	4.7	4.4	4.9	4.8	5.3	4.6	5.0	5.9	5.6	5.5	4.9	4.5	4.6	4.8	4.7	4.5	3.9	5.0	4.3	4.1	3.9	3.2	5.2	5.0	4.4	4.9	4.8	4.8	5.1	5.2	5.5	5.2
4.5	4.8	4.0	4.5	4.8	3.9	4.3	3.8	3.7	4.0	4.4	5.2	4.4	4.2	4.6	4.2	3.8	4.0	4.3	5.1	3.8	3.9	4.8	4.3	4.4	4.0	4.0	4.2	4.6	4.4	4.0	4.1	4.2	5.1	4.7	4.4
4.1	4.3	4.1	4.0	3.5	3.6	3.5	3.4	3.5	3.5	3.6	3.6	3.8	3.6	3.4	3.3	3.2	3.4	3.6	3.8	3.8	3.8	3.9	3.8	4.0	4.1	3.7	4.0	3.7	3.5	3.5	3.5	3.8	3.8	4.1	4.7
3.2	3.5	3.2	3.1	3.2	2.9	3.0	3.2	3.3	3.2	3.0	3.2	3.1	3.0	3.2	3.3	3.0	3.0	3.0	2.9	2.9	2.9	2.8	2.9	3.3	3.8	3.7	3.4	3.6	3.8	3.7	3.6	3.2	2.9	2.9	3.1
2.8	2.7	2.7	2.8	3.0	3.0	3.0	3.1	3.0	3.0	2.8	3.5	3.1	3.2	3.5	3.3	3.3	2.9	2.6	2.6	2.5	2.6	4.4	6.0	4.9	3.2	4.9	6.6	7.2	6.3	6.8	7.4	5.2	3.5	3.1	3.1
2.3	2.3	2.5	2.7	3.6	4.1	4.4	4.9	4.8	5.0	3.4	2.9	2.5	2.8	3.4	4.0	5.0	6.0	7.0	7.4	8.1	7.4	5.8	4.5	6.1	6.4	5.2	4.1	4.2	5.0	4.5	3.3	5.0	5.4	4.2	2.3
5.0	5.0	5.3	5.6	5.6	5.3	5.2	5.3	5.5	4.6	5.1	5.3	5.8	5.7	5.8	5.3	5.0	4.5	3.7	2.8	2.1	2.4	2.7	2.5	2.1	2.0	1.5	2.0	2.1	2.2	2.3	2.6	3.8	5.1	5.7	5.2

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

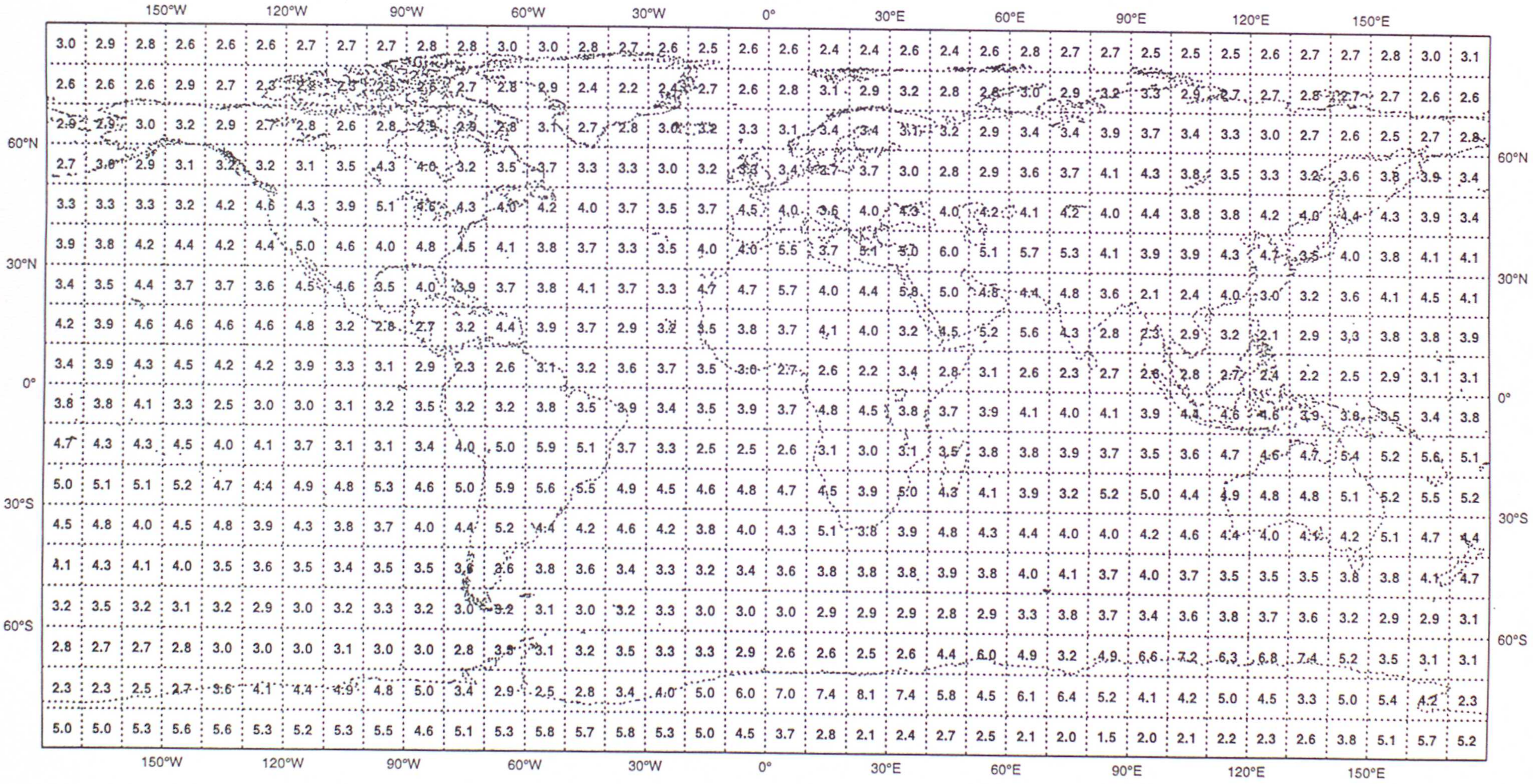
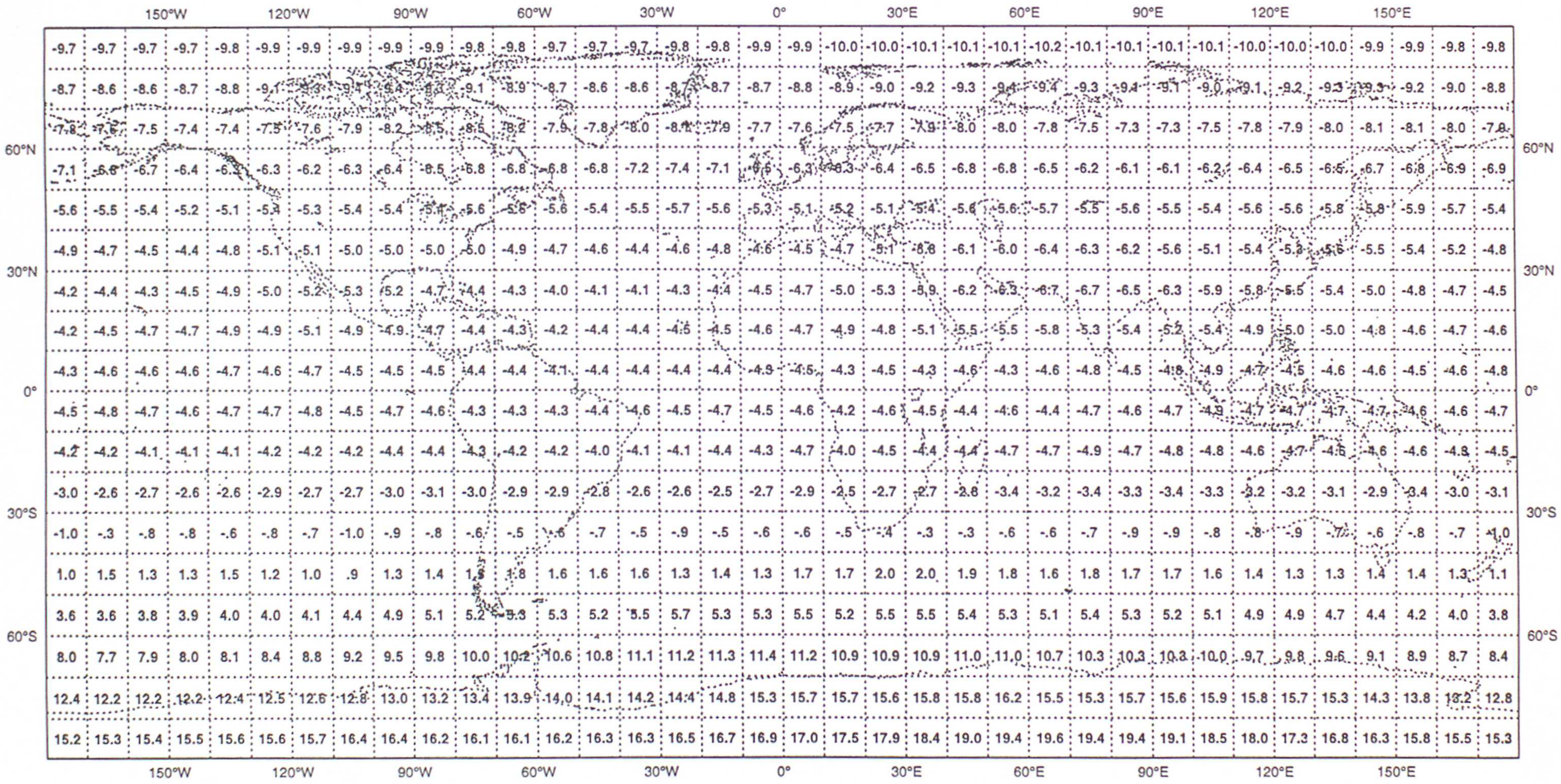

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
3.0 2.9 2.8 2.6 2.6 2.6 2.7 2.7 2.7 2.8 2.8 3.0 3.0 2.8 2.7 2.6 2.5 2.6 2.6 2.4 2.4 2.6 2.4 2.6 2.8 2.7 2.7 2.5 2.5 2.5 2.6 2.7 2.7 2.8 3.0 3.1
2.6 2.6 2.6 2.9 2.7 2.3 2.8 2.3 2.5 2.6 2.7 2.8 2.9 2.4 2.2 2.4 2.7 2.6 2.8 3.1 2.9 3.2 2.8 2.8 3.0 2.9 3.2 3.3 2.9 2.7 2.7 2.8 2.7 2.7 2.6 2.6
2.9 2.9 3.0 3.2 2.9 2.7 2.8 2.6 2.8 2.9 2.9 2.8 3.1 2.7 2.8 3.0 3.2 3.3 3.1 3.4 3.4 3.1 3.2 2.9 3.4 3.4 3.9 3.7 3.4 3.3 3.0 2.7 2.6 2.5 2.7 2.8
2.7 3.6 2.9 3.1 3.2 3.2 3.1 3.5 4.3 4.0 3.2 3.5 3.7 3.3 3.3 3.0 3.2 3.3 3.4 2.7 3.7 3.0 2.8 2.9 3.6 3.7 4.1 4.3 3.8 3.5 3.3 3.2 3.6 3.8 3.9 3.4
3.3 3.3 3.3 3.2 4.2 4.6 4.3 3.9 5.1 4.6 4.3 4.0 4.2 4.0 3.7 3.5 3.7 4.5 4.0 3.6 4.0 4.3 4.0 4.2 4.1 4.2 4.0 4.4 3.8 3.8 4.2 4.0 4.4 4.3 3.9 3.4
3.9 3.8 4.2 4.4 4.2 4.4 5.0 4.6 4.0 4.8 4.5 4.1 3.8 3.7 3.3 3.5 4.0 4.0 5.5 3.7 5.1 5.0 6.0 5.1 5.7 5.3 4.1 3.9 3.9 4.3 4.7 3.5 4.0 3.8 4.1 4.1
3.4 3.5 4.4 3.7 3.7 3.6 4.5 4.6 3.5 4.0 3.9 3.7 3.8 4.1 3.7 3.3 4.7 4.7 5.7 4.0 4.4 5.8 5.0 4.8 4.4 4.8 3.6 2.1 2.4 4.0 3.0 3.2 3.6 4.1 4.5 4.1
4.2 3.9 4.6 4.6 4.6 4.6 4.8 3.2 2.8 2.7 3.2 4.4 3.9 3.7 2.9 3.2 3.5 3.8 3.7 4.1 4.0 3.2 4.5 5.2 5.6 4.3 2.8 2.3 2.9 3.2 2.1 2.9 3.3 3.8 3.8 3.9
3.4 3.9 4.3 4.5 4.2 4.2 3.9 3.3 3.1 2.9 2.3 2.6 3.1 3.2 3.6 3.7 3.5 3.0 2.7 2.6 2.2 3.4 2.8 3.1 2.6 2.3 2.7 2.6 2.8 2.7 2.4 2.2 2.5 2.9 3.1 3.1
3.8 3.8 4.1 3.3 2.5 3.0 3.0 3.1 3.2 3.5 3.2 3.2 3.8 3.5 3.9 3.4 3.5 3.9 3.7 4.8 4.5 3.8 3.7 3.9 4.1 4.0 4.1 3.9 4.4 4.6 4.6 3.9 3.8 3.5 3.4 3.8
4.7 4.3 4.3 4.5 4.0 4.1 3.7 3.1 3.1 3.4 4.0 5.0 5.9 5.1 3.7 3.3 2.5 2.5 2.6 3.1 3.0 3.1 3.5 3.8 3.8 3.9 3.7 3.5 3.6 4.7 4.6 4.7 5.4 5.2 5.6 5.1
5.0 5.1 5.1 5.2 4.7 4.4 4.9 4.8 5.3 4.6 5.0 5.9 5.6 5.5 4.9 4.5 4.6 4.8 4.7 4.5 3.9 5.0 4.3 4.1 3.9 3.2 5.2 5.0 4.4 4.9 4.8 4.8 5.1 5.2 5.5 5.2
4.5 4.8 4.0 4.5 4.8 3.9 4.3 3.8 3.7 4.0 4.4 5.2 4.4 4.2 4.6 4.2 3.8 4.0 4.3 5.1 3.8 3.9 4.8 4.3 4.4 4.0 4.0 4.2 4.6 4.4 4.0 4.1 4.2 5.1 4.7 4.4
4.1 4.3 4.1 4.0 3.5 3.6 3.5 3.4 3.5 3.5 3.6 3.6 3.8 3.6 3.4 3.3 3.2 3.4 3.6 3.8 3.8 3.8 3.9 3.8 4.0 4.1 3.7 4.0 3.7 3.5 3.5 3.5 3.8 3.8 4.1 4.7
3.2 3.5 3.2 3.1 3.2 2.9 3.0 3.2 3.3 3.2 3.0 3.2 3.1 3.0 3.2 3.3 3.0 3.0 3.0 2.9 2.9 2.9 2.8 2.9 3.3 3.8 3.7 3.4 3.6 3.8 3.7 3.6 3.2 2.9 2.9 3.1
2.8 2.7 2.7 2.8 3.0 3.0 3.0 3.1 3.0 3.0 2.8 3.5 3.1 3.2 3.5 3.3 3.3 2.9 2.6 2.6 2.5 2.6 4.4 6.0 4.9 3.2 4.9 6.6 7.2 6.3 6.8 7.4 5.2 3.5 3.1 3.1
2.3 2.3 2.5 2.7 3.6 4.1 4.4 4.9 4.8 5.0 3.4 2.9 2.5 2.8 3.4 4.0 5.0 6.0 7.0 7.4 8.1 7.4 5.8 4.5 6.1 6.4 5.2 4.1 4.2 5.0 4.5 3.3 5.0 5.4 4.2 2.3
5.0 5.0 5.3 5.6 5.6 5.3 5.2 5.3 5.5 4.6 5.1 5.3 5.8 5.7 5.8 5.3 5.0 4.5 3.7 2.8 2.1 2.4 2.7 2.5 2.1 2.0 1.5 2.0 2.1 2.2 2.3 2.6 3.8 5.1 5.7 5.2

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



-9.7	-9.7	-9.7	-9.7	-9.8	-9.9	-9.9	-9.9	-9.9	-9.9	-9.8	-9.8	-9.7	-9.7	-9.7	-9.8	-9.8	-9.9	-9.9	-10.0	-10.0	-10.1	-10.1	-10.1	-10.2	-10.1	-10.1	-10.1	-10.1	-10.0	-10.0	-10.0	-9.9	-9.9	-9.8	-9.8
-8.7	-8.6	-8.6	-8.7	-8.8	-9.1	-9.3	-9.4	-9.4	-9.3	-9.1	-8.9	-8.7	-8.6	-8.6	-8.7	-8.7	-8.7	-8.8	-8.9	-9.0	-9.2	-9.3	-9.4	-9.4	-9.3	-9.4	-9.1	-9.0	-9.1	-9.2	-9.3	-9.3	-9.2	-9.0	-8.8
-7.8	-7.6	-7.5	-7.4	-7.4	-7.5	-7.6	-7.9	-8.2	-8.5	-8.5	-8.2	-7.9	-7.8	-8.0	-8.1	-7.9	-7.7	-7.6	-7.5	-7.7	-7.9	-8.0	-8.0	-7.8	-7.5	-7.3	-7.3	-7.5	-7.8	-7.9	-8.0	-8.1	-8.1	-8.0	-7.8
-7.1	-6.8	-6.7	-6.4	-6.3	-6.3	-6.2	-6.3	-6.4	-6.5	-6.8	-6.8	-6.8	-6.8	-7.2	-7.4	-7.1	-6.5	-6.3	-6.3	-6.4	-6.5	-6.8	-6.8	-6.5	-6.2	-6.1	-6.1	-6.2	-6.4	-6.5	-6.5	-6.7	-6.8	-6.9	-6.9
-5.6	-5.5	-5.4	-5.2	-5.1	-5.4	-5.3	-5.4	-5.4	-5.4	-5.6	-5.6	-5.6	-5.4	-5.5	-5.7	-5.6	-5.3	-5.1	-5.2	-5.1	-5.4	-5.6	-5.6	-5.7	-5.5	-5.6	-5.5	-5.4	-5.6	-5.6	-5.8	-5.8	-5.9	-5.7	-5.4
-4.9	-4.7	-4.5	-4.4	-4.8	-5.1	-5.1	-5.0	-5.0	-5.0	-5.0	-4.9	-4.7	-4.6	-4.4	-4.6	-4.8	-4.6	-4.5	-4.7	-5.1	-5.8	-6.1	-6.0	-6.4	-6.3	-6.2	-5.6	-5.1	-5.4	-5.3	-5.6	-5.5	-5.4	-5.2	-4.8
-4.2	-4.4	-4.3	-4.5	-4.9	-5.0	-5.2	-5.3	-5.2	-4.7	-4.4	-4.3	-4.0	-4.1	-4.1	-4.3	-4.4	-4.5	-4.7	-5.0	-5.3	-5.9	-6.2	-6.3	-6.7	-6.7	-6.5	-6.3	-5.9	-5.8	-5.5	-5.4	-5.0	-4.8	-4.7	-4.5
-4.2	-4.5	-4.7	-4.7	-4.9	-4.9	-5.1	-4.9	-4.9	-4.7	-4.4	-4.3	-4.2	-4.4	-4.4	-4.5	-4.5	-4.6	-4.7	-4.9	-4.8	-5.1	-5.5	-5.5	-5.8	-5.3	-5.4	-5.2	-5.4	-4.9	-5.0	-5.0	-4.8	-4.6	-4.7	-4.6
-4.3	-4.6	-4.6	-4.6	-4.7	-4.6	-4.7	-4.5	-4.5	-4.5	-4.4	-4.4	-4.1	-4.4	-4.4	-4.4	-4.4	-4.9	-4.5	-4.3	-4.5	-4.3	-4.6	-4.3	-4.6	-4.8	-4.5	-4.8	-4.9	-4.7	-4.5	-4.6	-4.6	-4.5	-4.6	-4.8
-4.5	-4.8	-4.7	-4.6	-4.7	-4.7	-4.8	-4.5	-4.7	-4.6	-4.3	-4.3	-4.3	-4.4	-4.6	-4.5	-4.7	-4.5	-4.6	-4.2	-4.6	-4.5	-4.4	-4.6	-4.4	-4.7	-4.6	-4.7	-4.9	-4.7	-4.7	-4.7	-4.7	-4.6	-4.6	-4.7
-4.2	-4.2	-4.1	-4.1	-4.1	-4.2	-4.2	-4.2	-4.4	-4.4	-4.3	-4.2	-4.2	-4.0	-4.1	-4.1	-4.4	-4.3	-4.7	-4.0	-4.5	-4.4	-4.4	-4.7	-4.7	-4.9	-4.7	-4.8	-4.8	-4.6	-4.7	-4.6	-4.6	-4.6	-4.8	-4.5
-3.0	-2.6	-2.7	-2.6	-2.6	-2.9	-2.7	-2.7	-3.0	-3.1	-3.0	-2.9	-2.9	-2.8	-2.6	-2.6	-2.5	-2.7	-2.9	-2.5	-2.7	-2.7	-2.8	-3.4	-3.2	-3.4	-3.3	-3.4	-3.3	-3.2	-3.2	-3.1	-2.9	-3.4	-3.0	-3.1
-1.0	-.3	-.8	-.8	-.6	-.8	-.7	-1.0	-.9	-.8	-.6	-.5	-.6	-.7	-.5	-.9	-.5	-.6	-.6	-.5	-.4	-.3	-.3	-.6	-.6	-.7	-.9	-.9	-.8	-.8	-.9	-.7	-.6	-.8	-.7	-1.0
1.0	1.5	1.3	1.3	1.5	1.2	1.0	.9	1.3	1.4	1.5	1.8	1.6	1.6	1.6	1.3	1.4	1.3	1.7	1.7	2.0	2.0	1.9	1.8	1.6	1.8	1.7	1.7	1.6	1.4	1.3	1.3	1.4	1.4	1.3	1.1
3.6	3.6	3.8	3.9	4.0	4.0	4.1	4.4	4.9	5.1	5.2	5.3	5.3	5.2	5.5	5.7	5.3	5.3	5.5	5.2	5.5	5.5	5.4	5.3	5.1	5.4	5.3	5.2	5.1	4.9	4.9	4.7	4.4	4.2	4.0	3.8
8.0	7.7	7.9	8.0	8.1	8.4	8.8	9.2	9.5	9.8	10.0	10.2	10.6	10.8	11.1	11.2	11.3	11.4	11.2	10.9	10.9	10.9	11.0	11.0	10.7	10.3	10.3	10.3	10.0	9.7	9.8	9.6	9.1	8.9	8.7	8.4
12.4	12.2	12.2	12.2	12.4	12.5	12.6	12.8	13.0	13.2	13.4	13.9	14.0	14.1	14.2	14.4	14.8	15.3	15.7	15.7	15.6	15.8	15.8	16.2	15.5	15.3	15.7	15.6	15.9	15.8	15.7	15.3	14.3	13.8	13.2	12.8
15.2	15.3	15.4	15.5	15.6	15.6	15.7	16.4	16.4	16.2	16.1	16.1	16.2	16.3	16.3	16.5	16.7	16.9	17.0	17.5	17.9	18.4	19.0	19.4	19.6	19.4	19.4	19.1	18.5	18.0	17.3	16.8	16.3	15.8	15.5	15.3

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

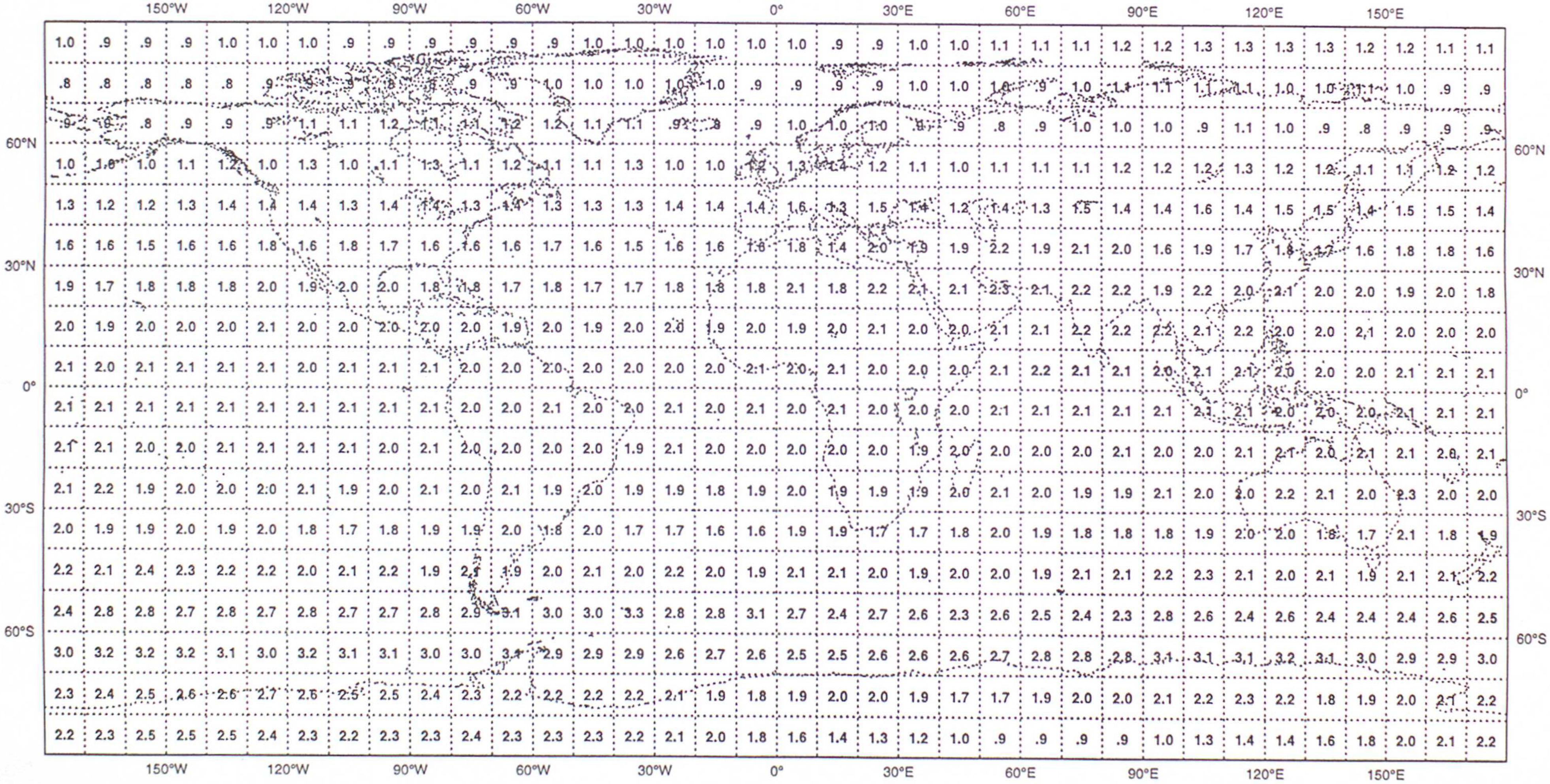
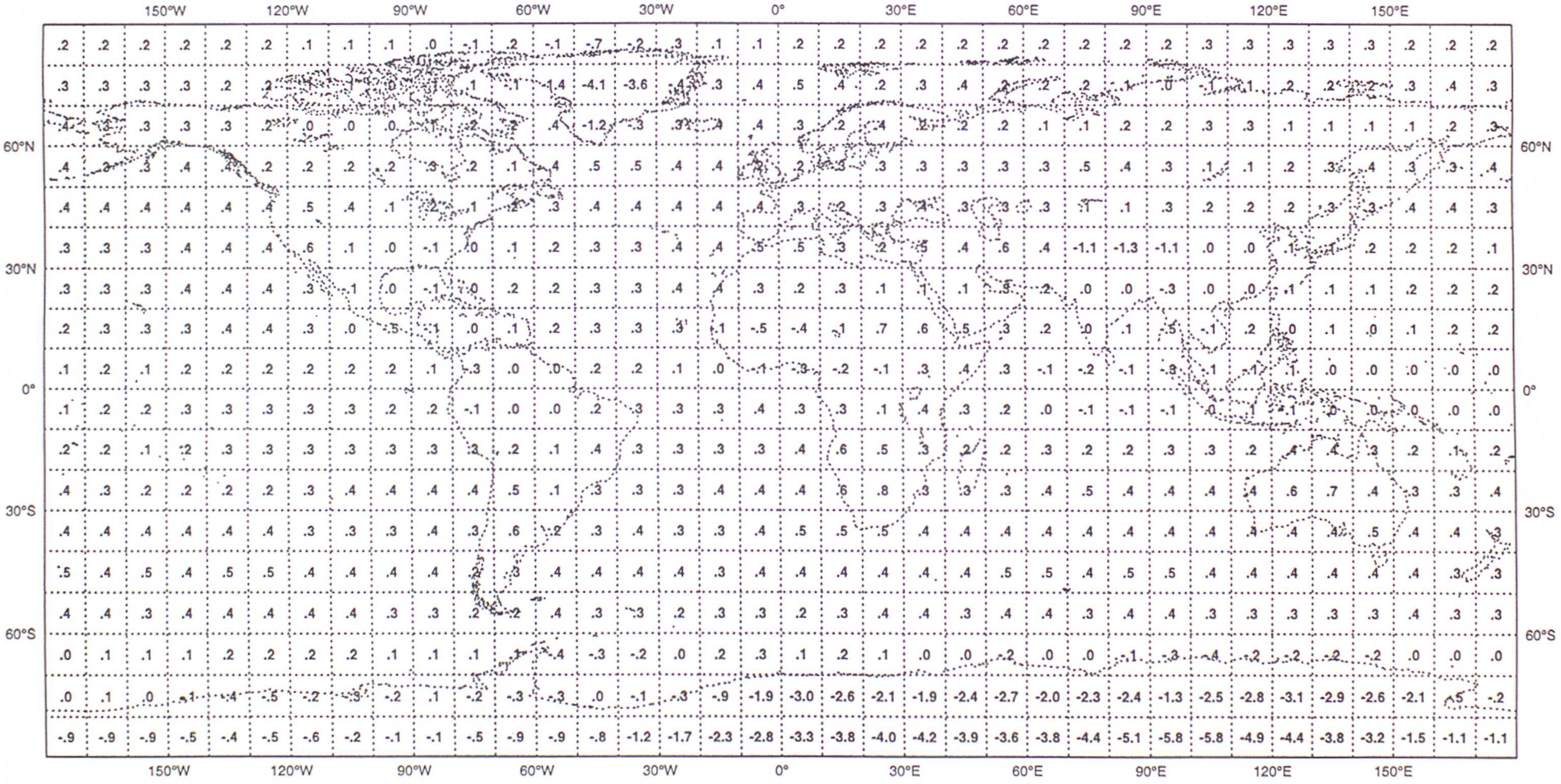

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.0 .9 .9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.1 1.1 1.1 1.2 1.2 1.3 1.3 1.3 1.3 1.2 1.2 1.1 1.1
.8 .8 .8 .8 .8 .9 .9 .9 .8 .8 .9 .9 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 1.0 1.0 1.0 .9 1.0 1.1 1.1 1.1 1.1 1.0 1.0 1.1 1.0 .9 .9
.9 .8 .8 .9 .9 .9 1.1 1.1 1.2 1.1 1.1 1.2 1.2 1.1 1.1 .9 .8 .9 1.0 1.0 1.0 .9 .9 .8 .9 1.0 1.0 1.0 .9 1.1 1.0 .9 .8 .9 .9 .9
1.0 1.6 1.0 1.1 1.2 1.0 1.3 1.0 1.1 1.3 1.1 1.2 1.1 1.1 1.3 1.0 1.0 1.2 1.3 1.4 1.2 1.1 1.0 1.1 1.1 1.1 1.2 1.2 1.2 1.3 1.2 1.2 1.1 1.1 1.2 1.2
1.3 1.2 1.2 1.3 1.4 1.4 1.4 1.3 1.4 1.4 1.3 1.4 1.3 1.3 1.3 1.4 1.4 1.4 1.6 1.3 1.5 1.4 1.2 1.4 1.3 1.5 1.4 1.4 1.6 1.4 1.5 1.5 1.4 1.5 1.5 1.4
1.6 1.6 1.5 1.6 1.6 1.8 1.6 1.8 1.7 1.6 1.6 1.6 1.7 1.6 1.5 1.6 1.6 1.6 1.8 1.4 2.0 1.9 1.9 2.2 1.9 2.1 2.0 1.6 1.9 1.7 1.8 1.7 1.6 1.8 1.8 1.6
1.9 1.7 1.8 1.8 1.8 2.0 1.9 2.0 2.0 1.8 1.8 1.7 1.8 1.7 1.7 1.8 1.8 1.8 2.1 1.8 2.2 2.1 2.1 2.3 2.1 2.2 2.2 1.9 2.2 2.0 2.1 2.0 2.0 1.9 2.0 1.8
2.0 1.9 2.0 2.0 2.0 2.1 2.0 2.0 2.0 2.0 2.0 1.9 2.0 1.9 2.0 2.0 1.9 2.0 1.9 2.0 2.1 2.0 2.0 2.1 2.1 2.2 2.2 2.2 2.1 2.2 2.0 2.0 2.1 2.0 2.0 2.0
2.1 2.0 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.1 2.0 2.1 2.0 2.0 2.0 2.1 2.2 2.1 2.1 2.0 2.1 2.1 2.0 2.0 2.0 2.1 2.1 2.1
2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.0 2.1 2.0 2.0 2.1 2.0 2.1 2.0 2.1 2.0 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.0 2.0 2.1 2.1 2.1
2.1 2.1 2.0 2.0 2.1 2.1 2.1 2.1 2.0 2.1 2.0 2.0 2.0 2.0 1.9 2.1 2.0 2.0 2.0 2.0 2.0 1.9 2.0 2.0 2.0 2.0 2.1 2.0 2.0 2.1 2.1 2.0 2.1 2.1 2.0 2.1
2.1 2.2 1.9 2.0 2.0 2.0 2.1 1.9 2.0 2.1 2.0 2.1 1.9 2.0 1.9 1.9 1.8 1.9 2.0 1.9 1.9 1.9 2.0 2.1 2.0 1.9 1.9 2.1 2.0 2.0 2.2 2.1 2.0 2.3 2.0 2.0
2.0 1.9 1.9 2.0 1.9 2.0 1.8 1.7 1.8 1.9 1.9 2.0 1.8 2.0 1.7 1.7 1.6 1.6 1.9 1.9 1.7 1.7 1.8 2.0 1.9 1.8 1.8 1.8 1.9 2.0 2.0 1.8 1.7 2.1 1.8 1.9
2.2 2.1 2.4 2.3 2.2 2.2 2.0 2.1 2.2 1.9 2.1 1.9 2.0 2.1 2.0 2.2 2.0 1.9 2.1 2.1 2.0 1.9 2.0 2.0 1.9 2.1 2.1 2.2 2.3 2.1 2.0 2.1 1.9 2.1 2.1 2.2
2.4 2.8 2.8 2.7 2.8 2.7 2.8 2.7 2.7 2.8 2.9 3.1 3.0 3.0 3.3 2.8 2.8 3.1 2.7 2.4 2.7 2.6 2.3 2.6 2.5 2.4 2.3 2.8 2.6 2.4 2.6 2.4 2.4 2.4 2.6 2.5
3.0 3.2 3.2 3.2 3.1 3.0 3.2 3.1 3.1 3.0 3.0 3.1 2.9 2.9 2.9 2.6 2.7 2.6 2.5 2.5 2.6 2.6 2.6 2.7 2.8 2.8 2.8 3.1 3.1 3.1 3.2 3.1 3.0 2.9 2.9 3.0
2.3 2.4 2.5 2.6 2.6 2.7 2.6 2.5 2.5 2.4 2.3 2.2 2.2 2.2 2.2 2.1 1.9 1.8 1.9 2.0 2.0 1.9 1.7 1.7 1.9 2.0 2.0 2.1 2.2 2.3 2.2 1.8 1.9 2.0 2.1 2.2
2.2 2.3 2.5 2.5 2.5 2.4 2.3 2.2 2.3 2.3 2.4 2.3 2.3 2.3 2.2 2.1 2.0 1.8 1.6 1.4 1.3 1.2 1.0 .9 .9 .9 .9 1.0 1.3 1.4 1.4 1.6 1.8 2.0 2.1 2.2

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



.2	.2	.2	.2	.2	.2	.1	.1	.1	.0	-.1	.2	-.1	-.7	-.2	.3	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.2	.2	.2
.3	.3	.3	.3	.2	.2	.1	.1	.0	.1	.1	-.1	-1.4	-4.1	-3.6	-.4	.3	.4	.5	.4	.2	.3	.4	.2	.2	.2	-.1	.0	-.1	.1	.2	.2	.2	.3	.4	.3
.4	.3	.3	.3	.3	.2	.0	.0	.0	.1	.2	.2	.4	-1.2	-.3	.3	.4	.4	.3	.2	.4	.2	.2	.2	.1	.1	.2	.2	.3	.3	.1	.1	.1	.1	.2	.3
.4	.3	.3	.4	.4	.2	.2	.2	.2	.3	.2	.1	.4	.5	.5	.4	.4	.2	.2	.3	.3	.3	.3	.3	.3	.5	.4	.3	.1	.1	.2	.3	.4	.3	.3	.4
.4	.4	.4	.4	.4	.4	.5	.4	.1	.2	.1	.2	.3	.4	.4	.4	.4	.4	.3	.2	.3	.4	.3	.3	.3	.1	.1	.3	.2	.2	.2	.3	.3	.4	.4	.3
.3	.3	.3	.4	.4	.4	.6	.1	.0	-.1	.0	.1	.2	.3	.3	.4	.4	.5	.5	.3	.2	.5	.4	.6	.4	-1.1	-1.3	-1.1	.0	.0	.1	.1	.2	.2	.2	.1
.3	.3	.3	.4	.4	.4	.3	-.1	.0	-.1	.0	.2	.2	.3	.3	.4	.4	.3	.2	.3	.1	.1	.1	.3	.2	.0	.0	-.3	.0	.0	.1	.1	.1	.2	.2	.2
.2	.3	.3	.3	.4	.4	.3	.0	-.5	-.1	.0	.1	.2	.3	.3	.3	.1	-.5	-.4	.1	.7	.6	.5	.3	.2	.0	.1	-.5	-.1	.2	.0	.1	.0	.1	.2	.2
.1	.2	.1	.2	.2	.2	.2	.2	.2	.1	-.3	.0	.0	.2	.2	.1	.0	-.1	-.3	-.2	-.1	.3	.4	.3	-.1	-.2	-.1	-.3	-.1	-.1	.1	.0	.0	.0	.0	.0
.1	.2	.2	.3	.3	.3	.3	.3	.2	.2	-.1	.0	.0	.2	.3	.3	.3	.4	.3	.3	.1	.4	.3	.2	.0	-.1	-.1	-.1	.0	.1	-.1	.0	.0	.0	.0	.0
.2	.2	.1	.2	.3	.3	.3	.3	.3	.3	.3	.2	.1	.4	.3	.3	.3	.3	.4	.6	.5	.3	.2	.2	.3	.2	.2	.3	.3	.2	.4	.4	.3	.2	.1	.2
.4	.3	.2	.2	.2	.2	.3	.4	.4	.4	.4	.5	.1	.3	.3	.3	.4	.4	.4	.6	.8	.3	.3	.3	.4	.5	.4	.4	.4	.4	.6	.7	.4	.3	.3	.4
.4	.4	.4	.4	.4	.4	.3	.3	.3	.4	.3	.6	.2	.3	.4	.3	.3	.4	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.3
.5	.4	.5	.4	.5	.5	.4	.4	.4	.4	.2	.3	.4	.4	.4	.4	.3	.4	.4	.4	.4	.4	.4	.5	.5	.4	.5	.5	.4	.4	.4	.4	.4	.4	.3	.3
.4	.4	.3	.4	.4	.4	.4	.4	.3	.3	.2	.2	.4	.3	.3	.2	.3	.3	.2	.3	.4	.4	.3	.4	.4	.3	.4	.4	.3	.3	.3	.3	.3	.4	.3	.3
.0	.1	.1	.1	.2	.2	.2	.2	.1	.1	.1	.1	.4	-.3	-.2	.0	.2	.3	.1	.2	.1	.0	.0	-.2	.0	.0	-.1	-.3	-.4	-.2	-.2	-.2	-.2	.0	.0	.0
.0	.1	.0	.1	.4	-.5	-.2	-.3	-.2	.1	-.2	-.3	-.3	.0	-.1	-.3	-.9	-1.9	-3.0	-2.6	-2.1	-1.9	-2.4	-2.7	-2.0	-2.3	-2.4	-1.3	-2.5	-2.8	-3.1	-2.9	-2.6	-2.1	.5	-.2
-.9	-.9	-.9	-.5	-.4	-.5	-.6	-.2	-.1	-.1	-.5	-.9	-.9	-.8	-1.2	-1.7	-2.3	-2.8	-3.3	-3.8	-4.0	-4.2	-3.9	-3.6	-3.8	-4.4	-5.1	-5.8	-5.8	-4.9	-4.4	-3.8	-3.2	-1.5	-1.1	-1.1

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

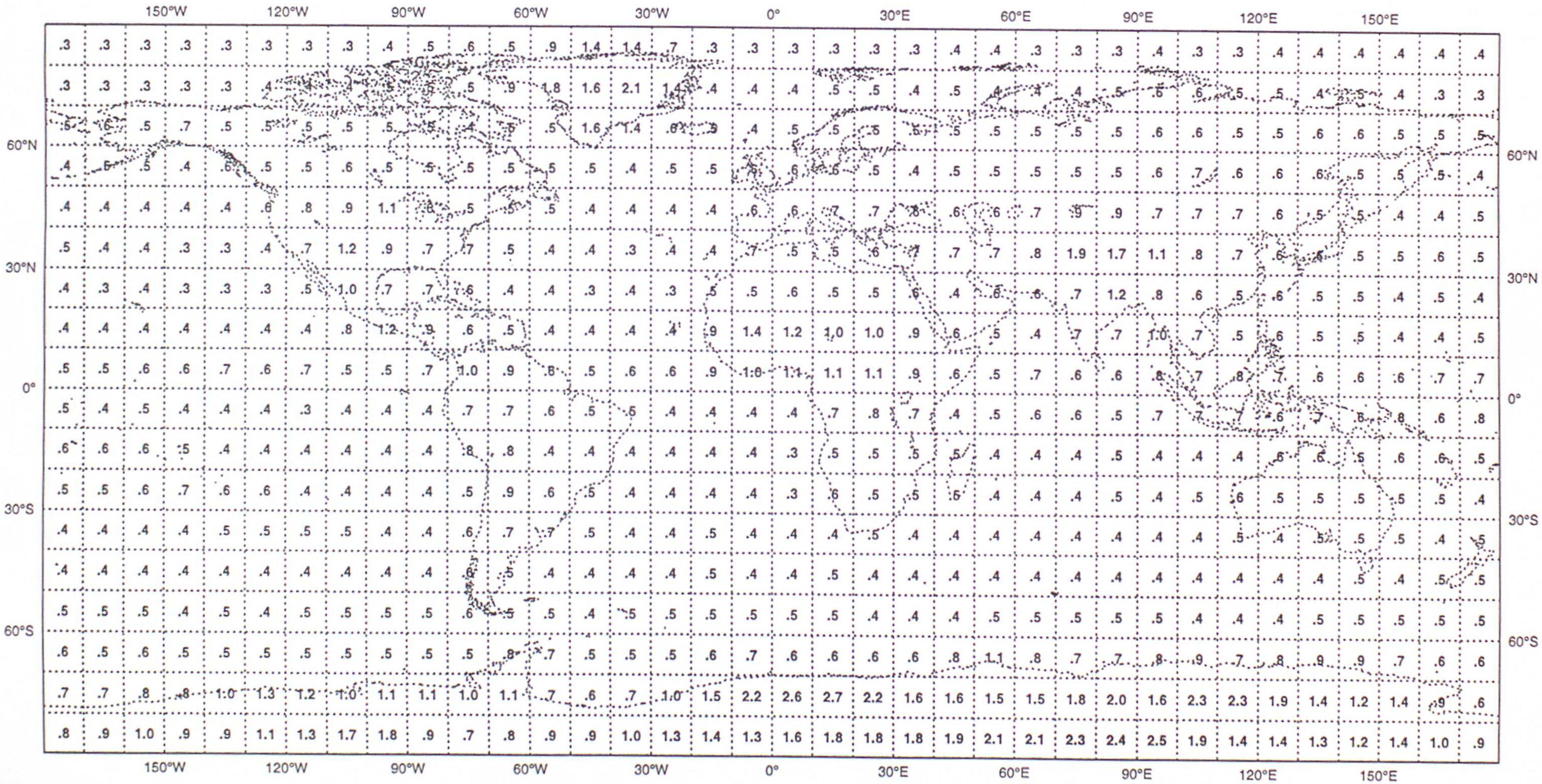

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .4 .5 .6 .5 .9 1.4 1.4 .7 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4
.3 .3 .3 .3 .3 .4 .4 .4 .5 .5 .5 .9 1.8 1.6 2.1 1.4 .4 .4 .4 .5 .5 .4 .5 .4 .4 .4 .5 .6 .6 .5 .5 .4 .5 .4 .3 .3
.5 .6 .5 .7 .5 .5 .5 .5 .5 .5 .4 .5 .5 1.6 1.4 .6 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .5 .6 .6 .5 .5 .5
.4 .5 .5 .4 .6 .5 .5 .6 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .6 .5 .5 .4 .5 .5 .5 .5 .5 .6 .7 .6 .6 .6 .5 .5 .5 .4
.4 .4 .4 .4 .4 .6 .8 .9 1.1 .6 .5 .5 .5 .4 .4 .4 .4 .6 .6 .7 .7 .8 .6 .6 .7 .9 .9 .7 .7 .7 .6 .5 .5 .4 .4 .5
.5 .4 .4 .3 .3 .4 .7 1.2 .9 .7 .7 .5 .4 .4 .3 .4 .4 .7 .5 .5 .6 .7 .7 .7 .8 1.9 1.7 1.1 .8 .7 .6 .6 .5 .5 .6 .5
.4 .3 .4 .3 .3 .3 .5 1.0 .7 .7 .6 .4 .4 .3 .4 .3 .5 .5 .6 .5 .5 .6 .4 .6 .6 .7 1.2 .8 .6 .5 .6 .5 .5 .4 .5 .4
.4 .4 .4 .4 .4 .4 .4 .8 1.2 .9 .6 .5 .4 .4 .4 .4 .9 1.4 1.2 1.0 1.0 .9 .6 .5 .4 .7 .7 1.0 .7 .5 .6 .5 .5 .4 .4 .5
.5 .5 .6 .6 .7 .6 .7 .5 .5 .7 1.0 .9 .8 .5 .6 .6 .9 1.0 1.1 1.1 1.1 .9 .6 .5 .7 .6 .6 .8 .7 .8 .7 .6 .6 .6 .7 .7
.5 .4 .5 .4 .4 .4 .3 .4 .4 .4 .7 .7 .6 .5 .5 .4 .4 .4 .4 .7 .8 .7 .4 .5 .6 .6 .5 .7 .7 .7 .6 .7 .6 .8 .6 .8
.6 .6 .6 .5 .4 .4 .4 .4 .4 .4 .8 .8 .4 .4 .4 .4 .4 .4 .3 .5 .5 .5 .5 .4 .4 .4 .5 .4 .4 .4 .6 .6 .5 .6 .6 .5
.5 .5 .6 .7 .6 .6 .4 .4 .4 .4 .5 .9 .6 .5 .4 .4 .4 .4 .3 .6 .5 .5 .5 .4 .4 .4 .5 .4 .5 .6 .5 .5 .5 .5 .5 .4
.4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .6 .7 .7 .5 .4 .4 .5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .5 .5 .4 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .6 .5 .4 .4 .4 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .5
.5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .6 .5 .5 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5
.6 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .8 .7 .5 .5 .5 .6 .7 .6 .6 .6 .6 .8 1.1 .8 .7 .7 .8 .9 .7 .8 .9 .9 .7 .6 .6
.7 .7 .8 .8 1.0 1.3 1.2 1.0 1.1 1.1 1.0 1.1 .7 .6 .7 1.0 1.5 2.2 2.6 2.7 2.2 1.6 1.6 1.5 1.5 1.8 2.0 1.6 2.3 2.3 1.9 1.4 1.2 1.4 .9 .6
.8 .9 1.0 .9 .9 1.1 1.3 1.7 1.8 .9 .7 .8 .9 .9 1.0 1.3 1.4 1.3 1.6 1.8 1.8 1.8 1.9 2.1 2.1 2.3 2.4 2.5 1.9 1.4 1.4 1.3 1.2 1.4 1.0 .9

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

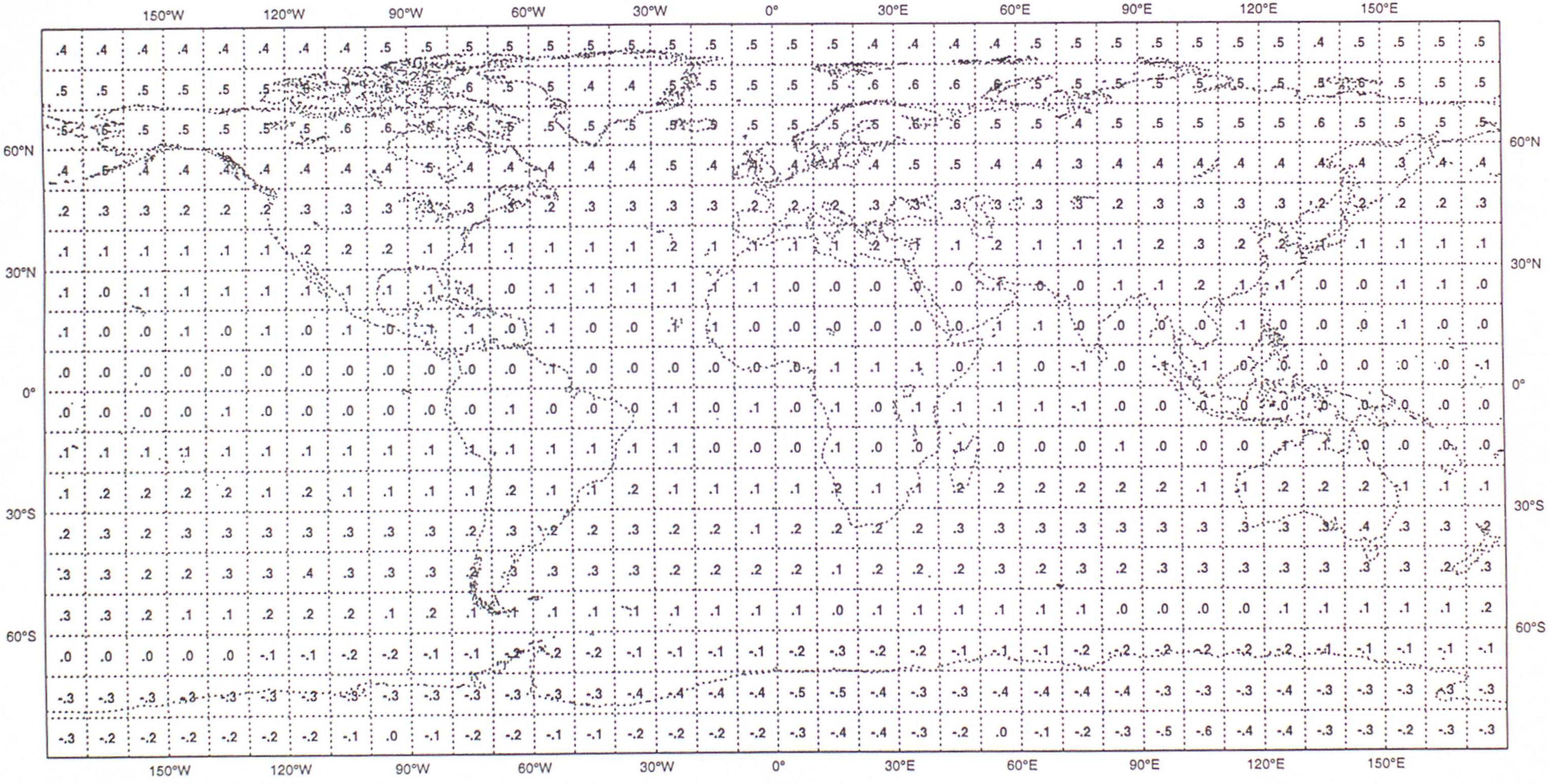

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

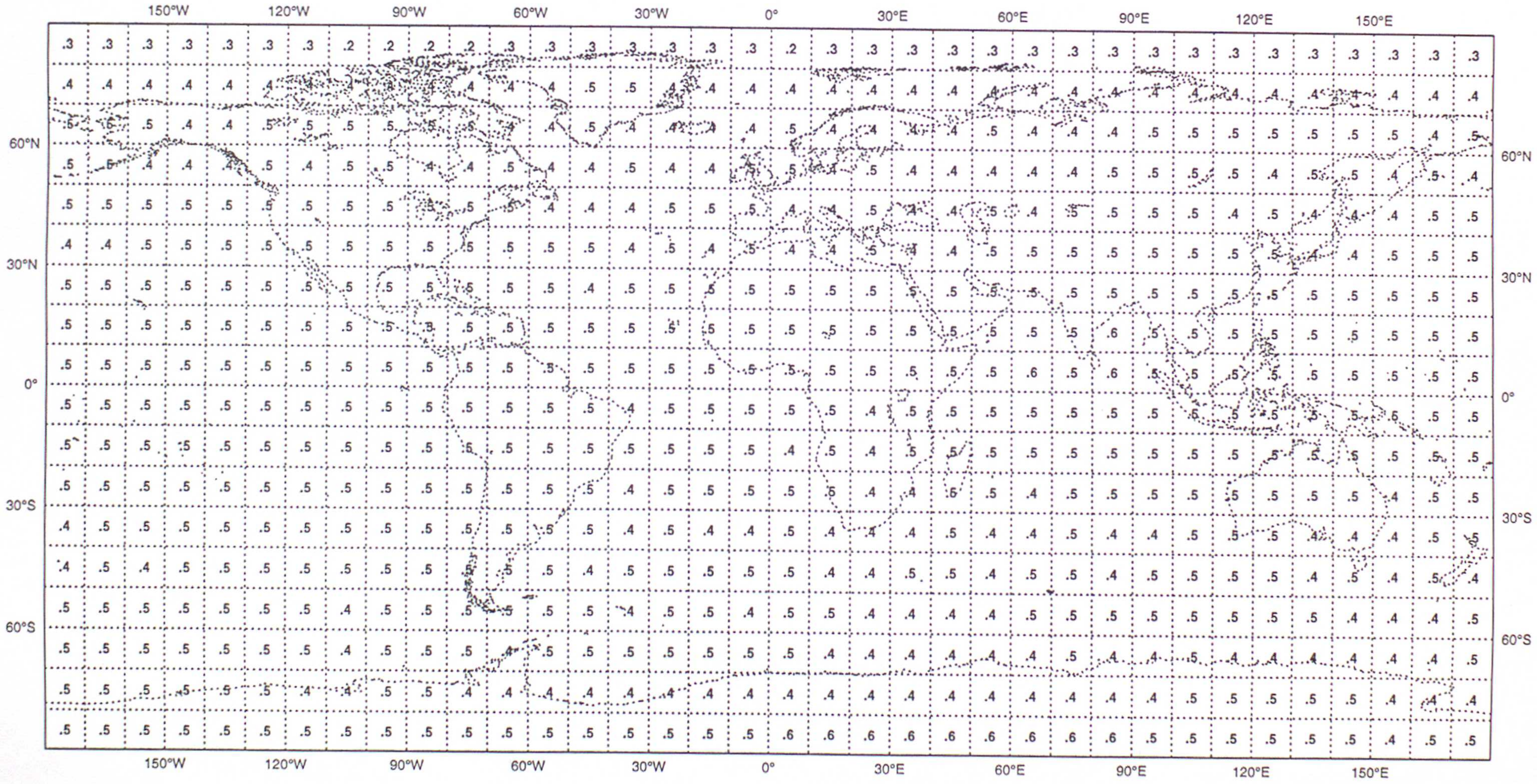

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

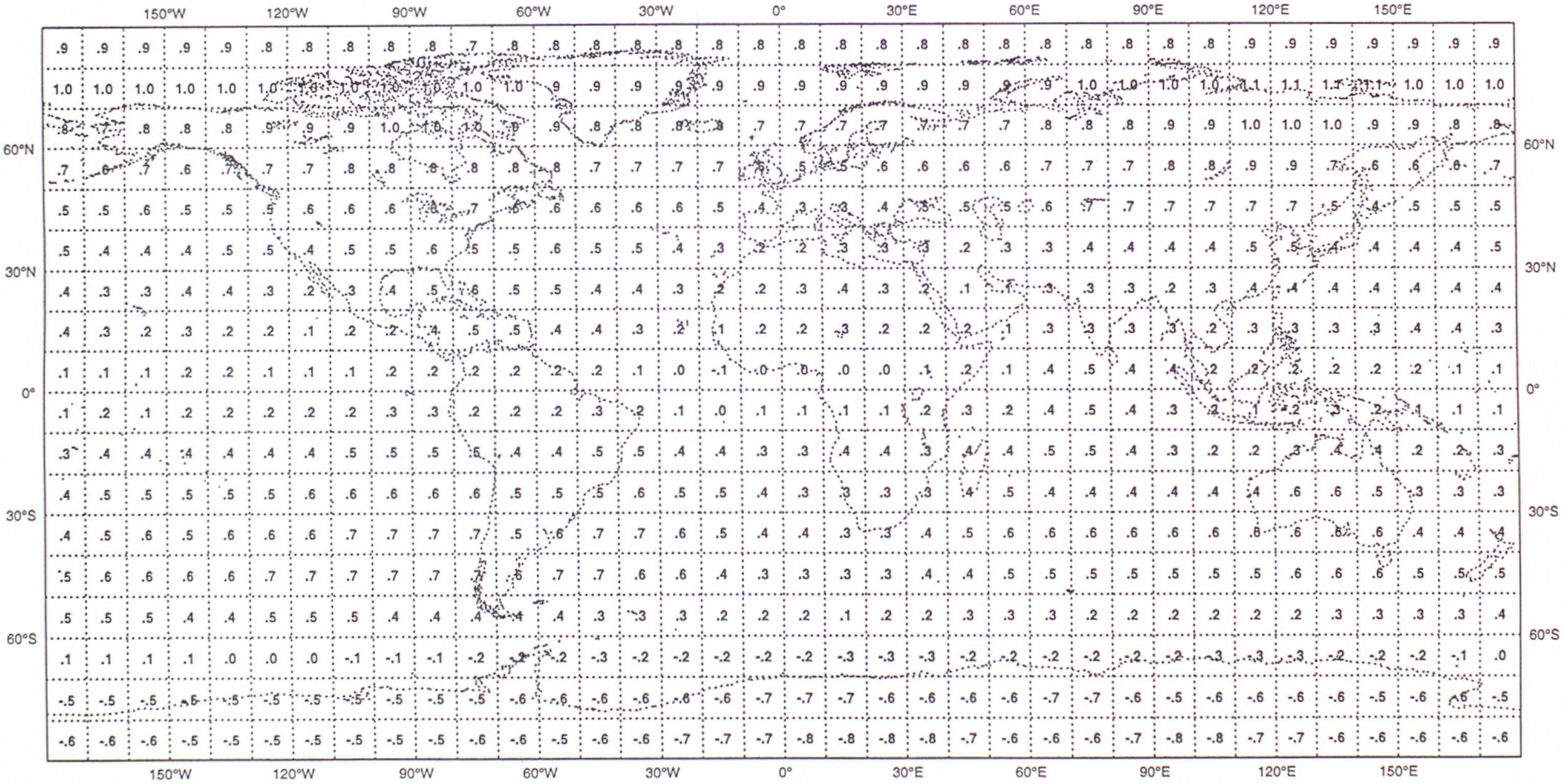

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

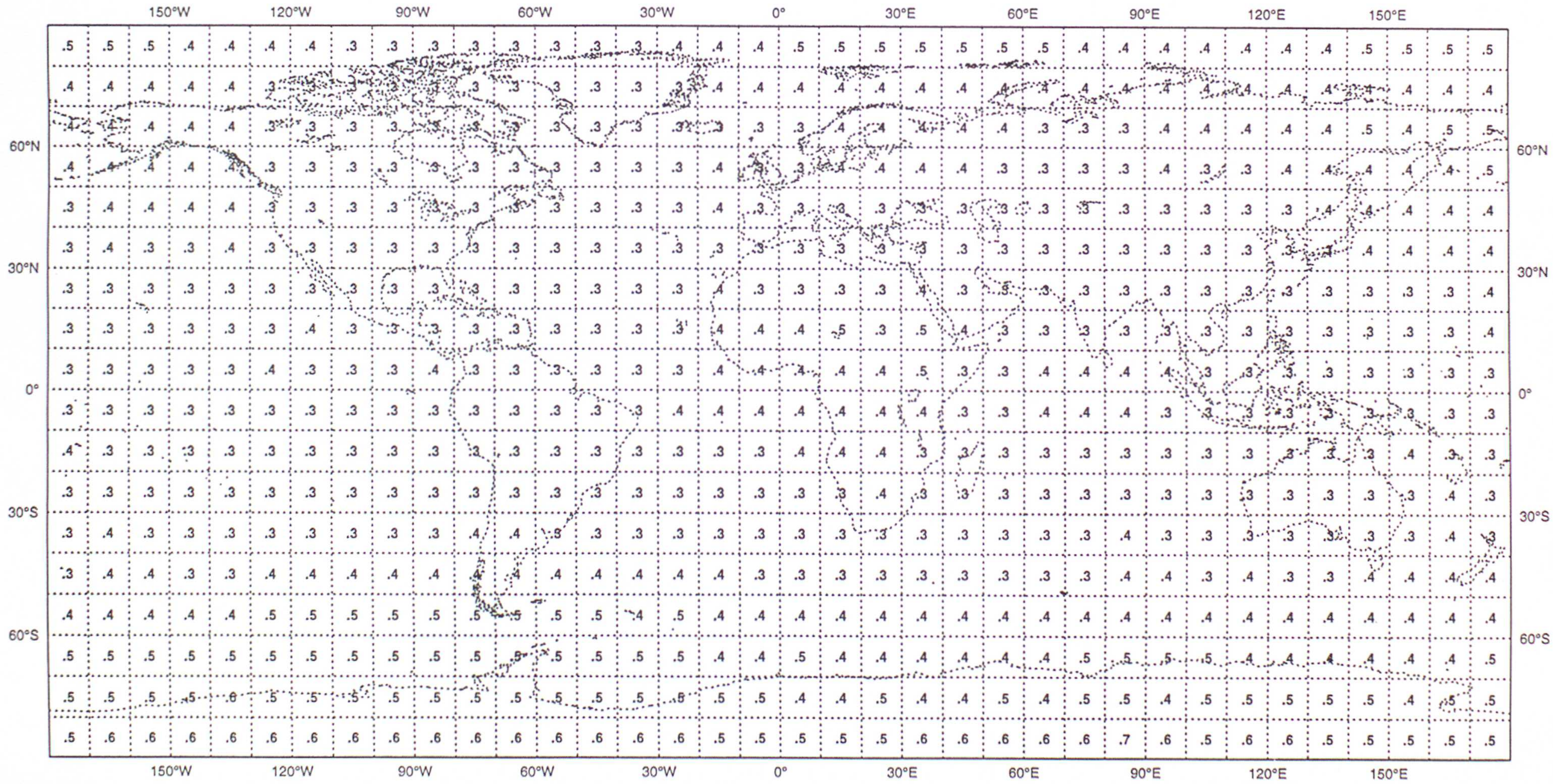
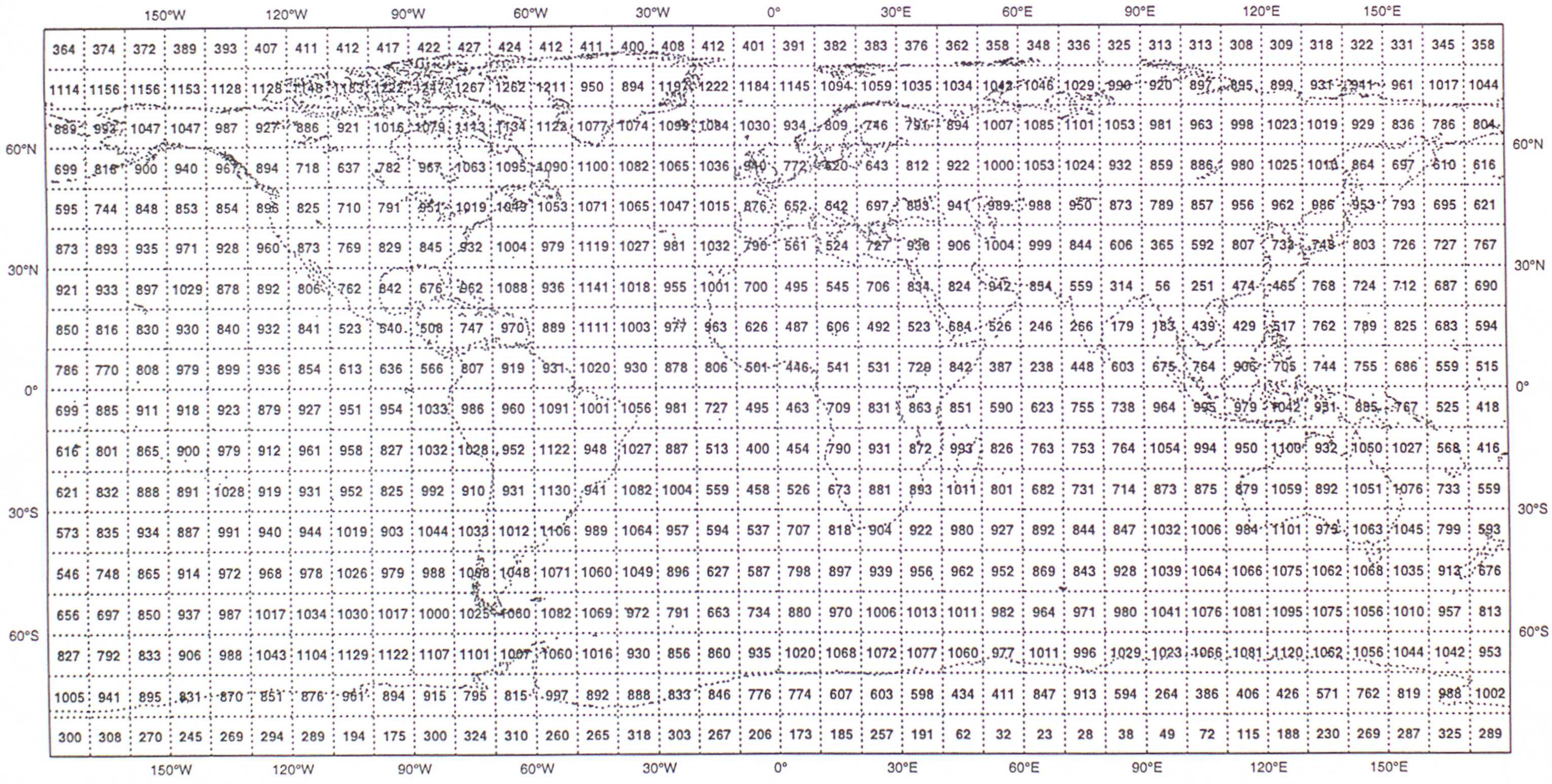

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .5 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5
.4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .5 .4 .5 .5
.4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .5
.3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4
.3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .4 .3 .5 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .3 .5 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .4 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .5 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3
.3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3
.3 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .3 .3 .4 .4 .4 .4
.4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5
.5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .4 .4 .5 .4 .5 .5 .4 .5 .5 .5 .5 .5 .4 .5 .5
.5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .7 .6 .5 .6 .6 .5 .5 .5 .5 .5

Figure 40. ATOVS mean daily count. JUNE 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 522667



364	374	372	389	393	407	411	412	417	422	427	424	412	411	400	408	412	401	391	382	383	376	362	358	348	336	325	313	313	308	309	318	322	331	345	358
1114	1156	1156	1153	1128	1128	1148	1183	1222	1247	1267	1262	1211	950	894	1197	1222	1184	1145	1094	1059	1035	1034	1042	1046	1029	990	920	897	895	899	931	941	961	1017	1044
889	992	1047	1047	987	927	886	921	1016	1079	1113	1134	1122	1077	1074	1099	1084	1030	934	809	746	791	894	1007	1085	1101	1053	981	963	998	1023	1019	929	836	786	804
699	816	900	940	967	894	718	637	782	967	1063	1095	1090	1100	1082	1065	1036	940	772	620	643	812	922	1000	1053	1024	932	859	886	980	1025	1010	864	697	610	616
595	744	848	853	854	896	825	710	791	951	1019	1049	1053	1071	1065	1047	1015	876	652	842	697	893	941	989	988	950	873	789	857	956	962	986	953	793	695	621
873	893	935	971	928	960	873	769	829	845	932	1004	979	1119	1027	981	1032	790	561	524	727	938	906	1004	999	844	606	365	592	807	733	748	803	726	727	767
921	933	897	1029	878	892	806	762	842	676	962	1088	936	1141	1018	955	1001	700	495	545	706	834	824	942	854	559	314	56	251	474	465	768	724	712	687	690
850	816	830	930	840	932	841	523	540	508	747	970	889	1111	1003	977	963	626	487	606	492	523	684	526	246	266	179	183	439	429	517	762	789	825	683	594
786	770	808	979	899	936	854	613	636	566	807	919	931	1020	930	878	806	501	446	541	531	729	842	387	238	448	603	675	764	906	705	744	755	686	559	515
699	885	911	918	923	879	927	951	954	1033	986	960	1091	1001	1056	981	727	495	463	709	831	863	851	590	623	755	738	964	995	979	1042	931	885	767	525	418
616	801	865	900	979	912	961	958	827	1032	1028	952	1122	948	1027	887	513	400	454	790	931	872	993	826	763	753	764	1054	994	950	1100	932	1050	1027	568	416
621	832	888	891	1028	919	931	952	825	992	910	931	1130	941	1082	1004	559	458	526	673	881	893	1011	801	682	731	714	873	875	879	1059	892	1051	1076	733	559
573	835	934	887	991	940	944	1019	903	1044	1033	1012	1106	989	1064	957	594	537	707	818	904	922	980	927	892	844	847	1032	1006	984	1101	975	1063	1045	799	593
546	748	865	914	972	968	978	1026	979	988	1098	1048	1071	1060	1049	896	627	587	798	897	939	956	962	952	869	843	928	1039	1064	1066	1075	1062	1068	1035	913	676
656	697	850	937	987	1017	1034	1030	1017	1000	1025	1060	1082	1069	972	791	663	734	880	970	1006	1013	1011	982	964	971	980	1041	1076	1081	1095	1075	1056	1010	957	813
827	792	833	906	988	1043	1104	1129	1122	1107	1101	1007	1060	1016	930	856	860	935	1020	1068	1072	1077	1060	977	1011	996	1029	1023	1066	1081	1120	1062	1056	1044	1042	953
1005	941	895	831	870	851	876	961	894	915	795	815	997	892	888	833	846	776	774	607	603	598	434	411	847	913	594	264	386	406	426	571	762	819	988	1002
300	308	270	245	269	294	289	194	175	300	324	310	260	265	318	303	267	206	173	185	257	191	62	32	23	28	38	49	72	115	188	230	269	287	325	289

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations

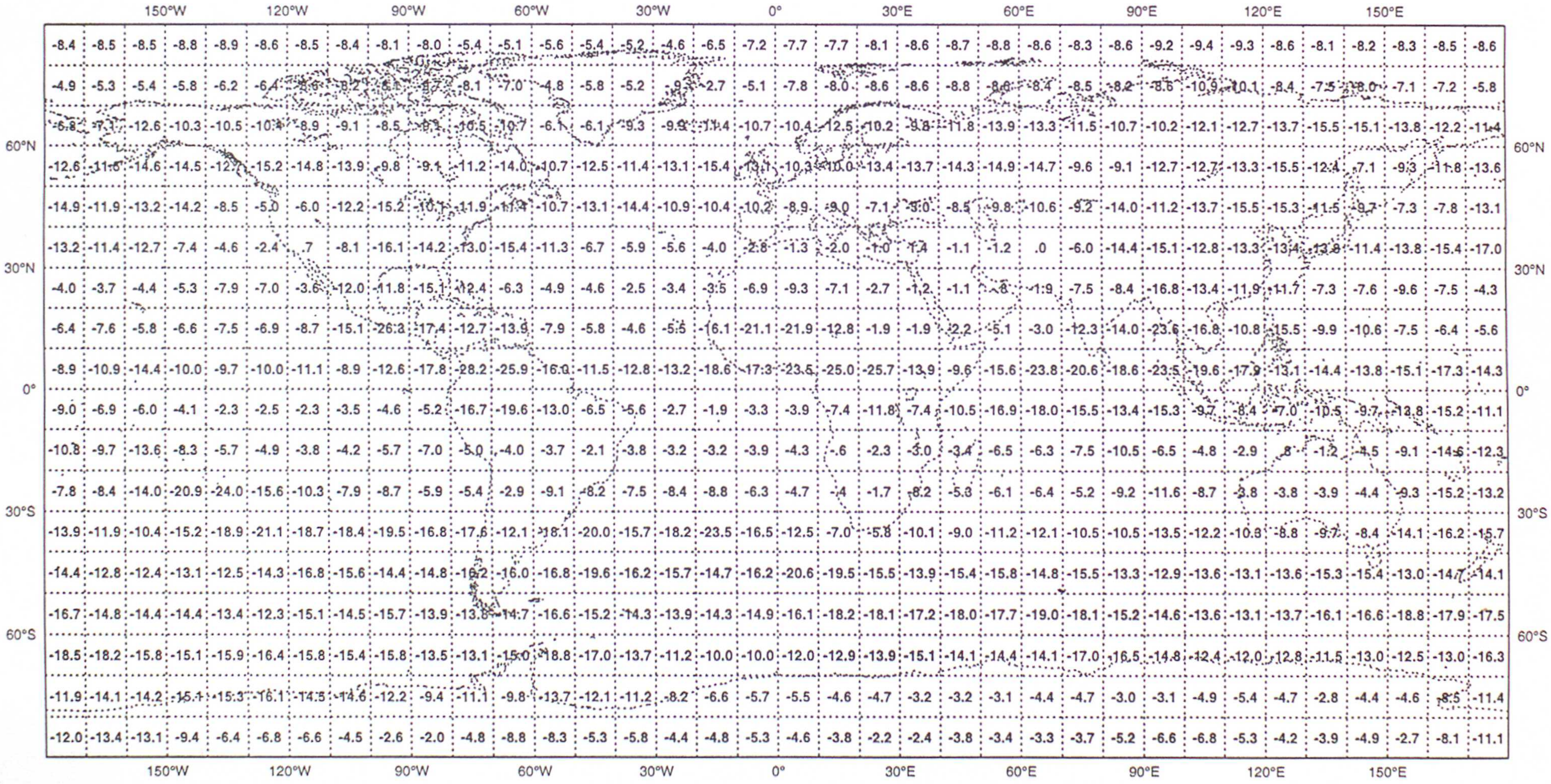
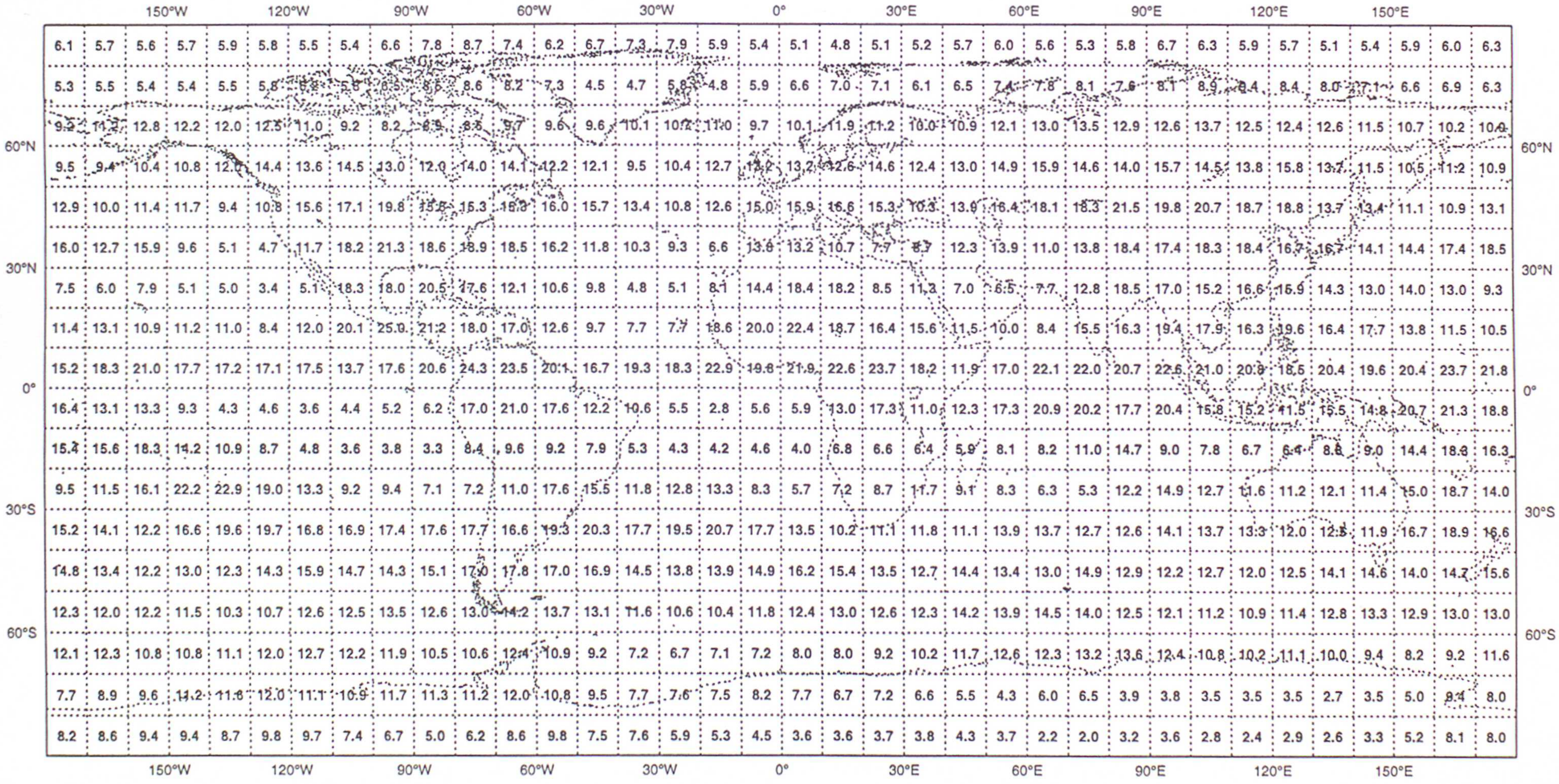
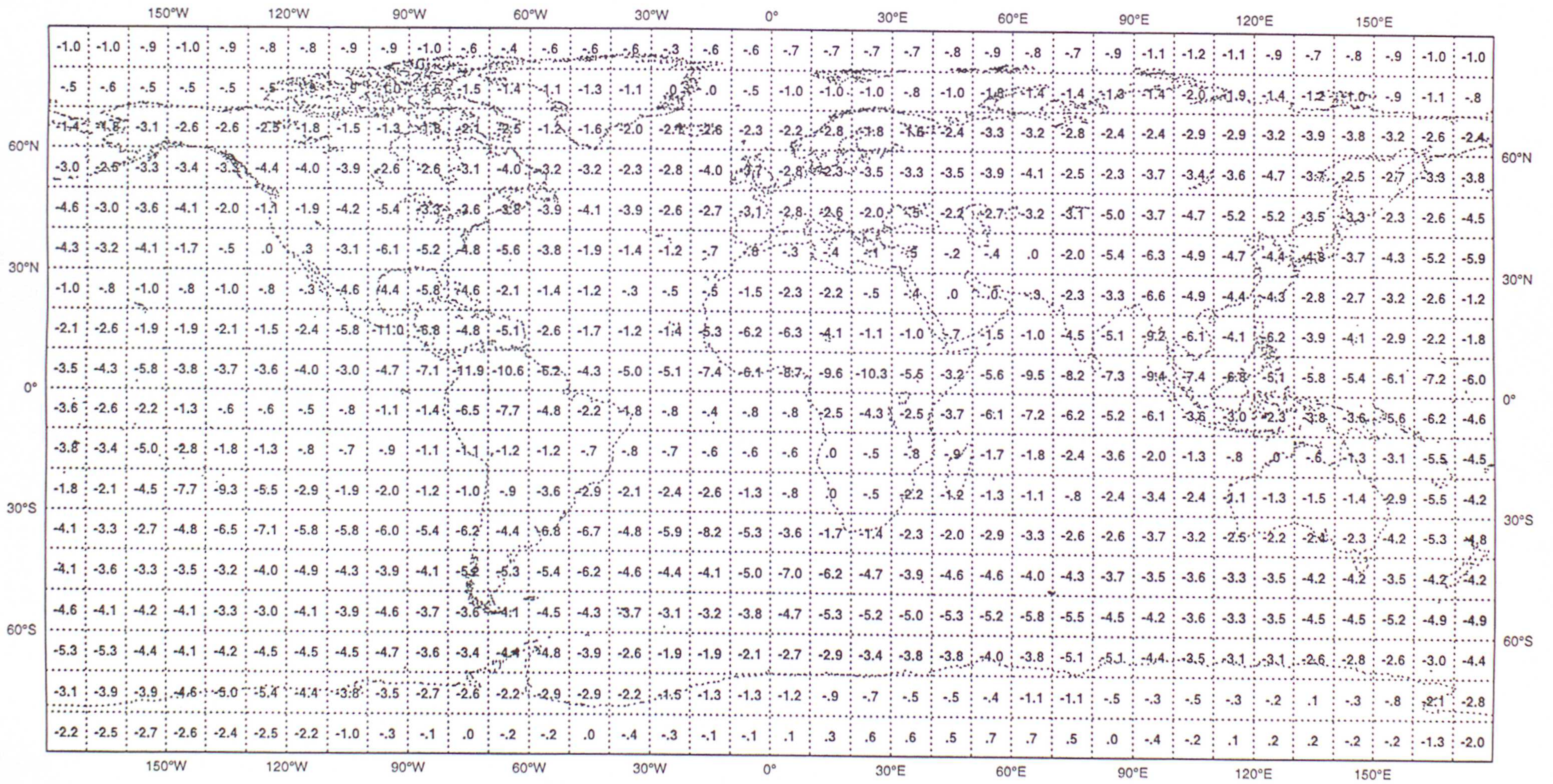

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-8.4 -8.5 -8.5 -8.8 -8.9 -8.6 -8.5 -8.4 -8.1 -8.0 -5.4 -5.1 -5.6 -5.4 -5.2 -4.6 -6.5 -7.2 -7.7 -7.7 -8.1 -8.6 -8.7 -8.8 -8.6 -8.3 -8.6 -9.2 -9.4 -9.3 -8.6 -8.1 -8.2 -8.3 -8.5 -8.6
-4.9 -5.3 -5.4 -5.8 -6.2 -6.4 -8.6 -8.2 -8.1 -8.7 -8.1 -7.0 -4.8 -5.8 -5.2 -9.3 -2.7 -5.1 -7.8 -8.0 -8.6 -8.6 -8.8 -8.6 -8.4 -8.5 -8.2 -8.6 -10.9 -10.1 -8.4 -7.5 -8.0 -7.1 -7.2 -5.8
-6.8 -7.1 -12.6 -10.3 -10.5 -10.4 -8.9 -9.1 -8.5 -9.3 -10.5 -10.7 -6.1 -6.1 -9.3 -9.9 -11.4 -10.7 -10.4 -12.5 -10.2 -9.8 -11.8 -13.9 -13.3 -11.5 -10.7 -10.2 -12.1 -12.7 -13.7 -15.5 -15.1 -13.8 -12.2 -11.4
-12.6 -11.6 -14.6 -14.5 -12.7 -15.2 -14.8 -13.9 -9.8 -9.1 -11.2 -14.0 -10.7 -12.5 -11.4 -13.1 -15.4 -13.1 -10.3 -10.0 -13.4 -13.7 -14.3 -14.9 -14.7 -9.6 -9.1 -12.7 -12.7 -13.3 -15.5 -12.4 -7.1 -9.3 -11.8 -13.6
-14.9 -11.9 -13.2 -14.2 -8.5 -5.0 -6.0 -12.2 -15.2 -10.1 -11.9 -11.4 -10.7 -13.1 -14.4 -10.9 -10.4 -10.2 -8.9 -9.0 -7.1 -3.0 -8.5 -9.8 -10.6 -9.2 -14.0 -11.2 -13.7 -15.5 -15.3 -11.5 -9.7 -7.3 -7.8 -13.1
-13.2 -11.4 -12.7 -7.4 -4.6 -2.4 .7 -8.1 -16.1 -14.2 -13.0 -15.4 -11.3 -6.7 -5.9 -5.6 -4.0 -2.8 -1.3 -2.0 -1.0 -1.4 -1.1 -1.2 .0 -6.0 -14.4 -15.1 -12.8 -13.3 -13.4 -13.8 -11.4 -13.8 -15.4 -17.0
-4.0 -3.7 -4.4 -5.3 -7.9 -7.0 -3.6 -12.0 -11.8 -15.1 -12.4 -6.3 -4.9 -4.6 -2.5 -3.4 -3.5 -6.9 -9.3 -7.1 -2.7 -1.2 -1.1 -.8 -1.9 -7.5 -8.4 -16.8 -13.4 -11.9 -11.7 -7.3 -7.6 -9.6 -7.5 -4.3
-6.4 -7.6 -5.8 -6.6 -7.5 -6.9 -8.7 -15.1 -26.3 -17.4 -12.7 -13.9 -7.9 -5.8 -4.6 -5.5 -16.1 -21.1 -21.9 -12.8 -1.9 -1.9 -2.2 -5.1 -3.0 -12.3 -14.0 -23.6 -16.8 -10.8 -15.5 -9.9 -10.6 -7.5 -6.4 -5.6
-8.9 -10.9 -14.4 -10.0 -9.7 -10.0 -11.1 -8.9 -12.6 -17.8 -28.2 -25.9 -16.0 -11.5 -12.8 -13.2 -18.6 -17.3 -23.5 -25.0 -25.7 -13.9 -9.6 -15.6 -23.8 -20.6 -18.6 -23.5 -19.6 -17.9 -13.1 -14.4 -13.8 -15.1 -17.3 -14.3
-9.0 -6.9 -6.0 -4.1 -2.3 -2.5 -2.3 -3.5 -4.6 -5.2 -16.7 -19.6 -13.0 -6.5 -5.6 -2.7 -1.9 -3.3 -3.9 -7.4 -11.8 -7.4 -10.5 -16.9 -18.0 -15.5 -13.4 -15.3 -9.7 -8.4 -7.0 -10.5 -9.7 -13.8 -15.2 -11.1
-10.8 -9.7 -13.6 -8.3 -5.7 -4.9 -3.8 -4.2 -5.7 -7.0 -5.0 -4.0 -3.7 -2.1 -3.8 -3.2 -3.2 -3.9 -4.3 -.6 -2.3 -3.0 -3.4 -6.5 -6.3 -7.5 -10.5 -6.5 -4.8 -2.9 .8 -1.2 -4.5 -9.1 -14.6 -12.3
-7.8 -8.4 -14.0 -20.9 -24.0 -15.6 -10.3 -7.9 -8.7 -5.9 -5.4 -2.9 -9.1 -8.2 -7.5 -8.4 -8.8 -6.3 -4.7 -.4 -1.7 -8.2 -5.3 -6.1 -6.4 -5.2 -9.2 -11.6 -8.7 -3.8 -3.8 -3.9 -4.4 -9.3 -15.2 -13.2
-13.9 -11.9 -10.4 -15.2 -18.9 -21.1 -18.7 -18.4 -19.5 -16.8 -17.6 -12.1 -18.1 -20.0 -15.7 -18.2 -23.5 -16.5 -12.5 -7.0 -5.8 -10.1 -9.0 -11.2 -12.1 -10.5 -10.5 -13.5 -12.2 -10.8 -8.8 -9.7 -8.4 -14.1 -16.2 -15.7
-14.4 -12.8 -12.4 -13.1 -12.5 -14.3 -16.8 -15.6 -14.4 -14.8 -16.2 -16.0 -16.8 -19.6 -16.2 -15.7 -14.7 -16.2 -20.6 -19.5 -15.5 -13.9 -15.4 -15.8 -14.8 -15.5 -13.3 -12.9 -13.6 -13.1 -13.6 -15.3 -15.4 -13.0 -14.7 -14.1
-16.7 -14.8 -14.4 -14.4 -13.4 -12.3 -15.1 -14.5 -15.7 -13.9 -13.8 -14.7 -16.6 -15.2 -14.3 -13.9 -14.3 -14.9 -16.1 -18.2 -18.1 -17.2 -18.0 -17.7 -19.0 -18.1 -15.2 -14.6 -13.6 -13.1 -13.7 -16.1 -16.6 -18.8 -17.9 -17.5
-18.5 -18.2 -15.8 -15.1 -15.9 -16.4 -15.8 -15.4 -15.8 -13.5 -13.1 -15.0 -18.8 -17.0 -13.7 -11.2 -10.0 -10.0 -12.0 -12.9 -13.9 -15.1 -14.1 -14.4 -14.1 -17.0 -16.5 -14.8 -12.4 -12.0 -12.8 -11.5 -13.0 -12.5 -13.0 -16.3
-11.9 -14.1 -14.2 -15.1 -15.3 -16.1 -14.5 -14.6 -12.2 -9.4 -11.1 -9.8 -13.7 -12.1 -11.2 -8.2 -6.6 -5.7 -5.5 -4.6 -4.7 -3.2 -3.2 -3.1 -4.4 -4.7 -3.0 -3.1 -4.9 -5.4 -4.7 -2.8 -4.4 -4.6 -8.5 -11.4
-12.0 -13.4 -13.1 -9.4 -6.4 -6.8 -6.6 -4.5 -2.6 -2.0 -4.8 -8.8 -8.3 -5.3 -5.8 -4.4 -4.8 -5.3 -4.6 -3.8 -2.2 -2.4 -3.8 -3.4 -3.3 -3.7 -5.2 -6.6 -6.8 -5.3 -4.2 -3.9 -4.9 -2.7 -8.1 -11.1

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



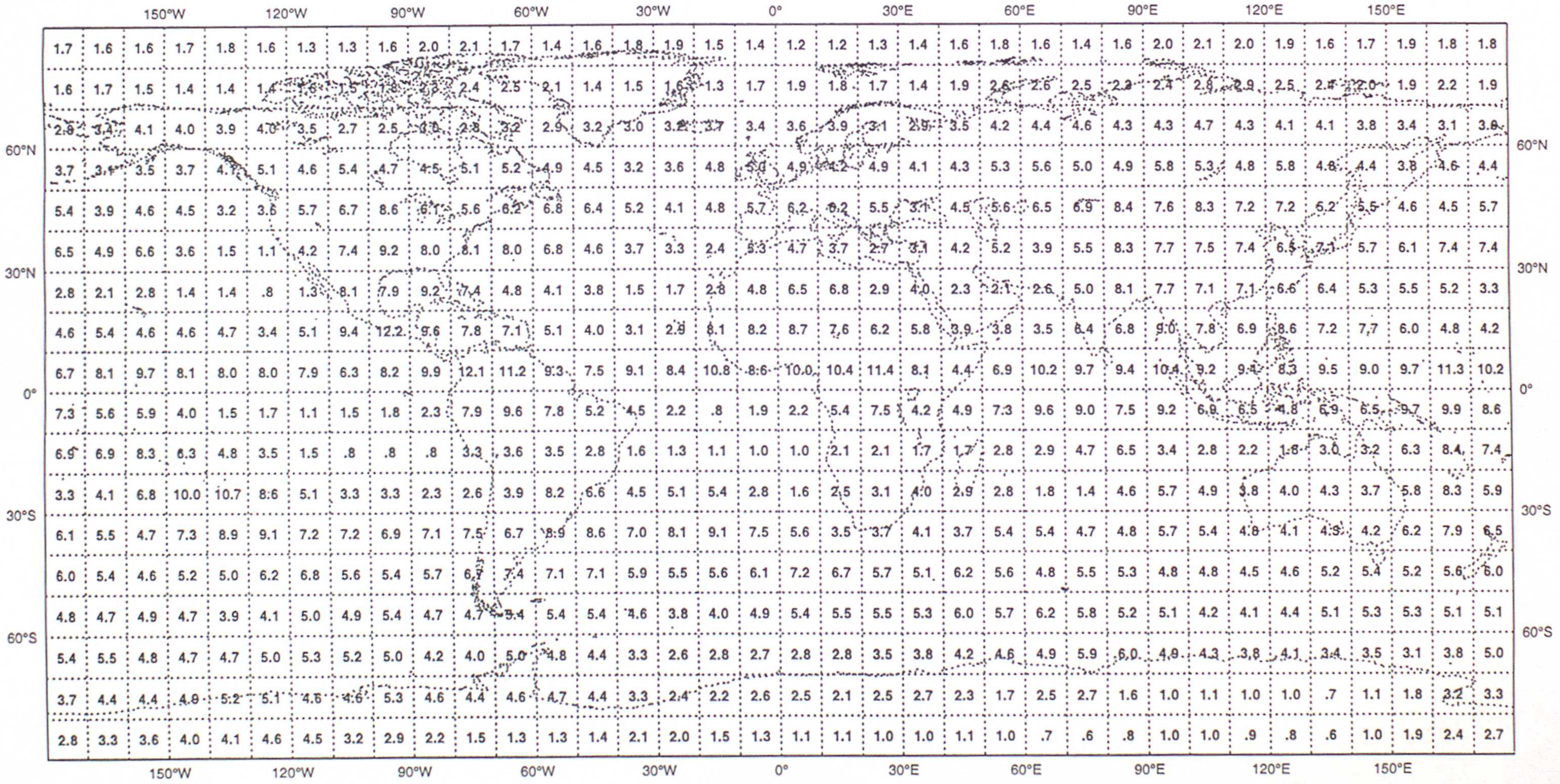
6.1	5.7	5.6	5.7	5.9	5.8	5.5	5.4	6.6	7.8	8.7	7.4	6.2	6.7	7.3	7.9	5.9	5.4	5.1	4.8	5.1	5.2	5.7	6.0	5.6	5.3	5.8	6.7	6.3	5.9	5.7	5.1	5.4	5.9	6.0	6.3
5.3	5.5	5.4	5.4	5.5	5.8	6.8	5.8	8.5	8.5	8.6	8.2	7.3	4.5	4.7	5.8	4.8	5.9	6.6	7.0	7.1	6.1	6.5	7.4	7.8	8.1	7.6	8.1	8.9	8.4	8.4	8.0	7.1	6.6	6.9	6.3
9.2	11.2	12.8	12.2	12.0	12.5	11.0	9.2	8.2	8.9	8.5	9.7	9.6	9.6	10.1	10.2	11.0	9.7	10.1	11.9	11.2	10.0	10.9	12.1	13.0	13.5	12.9	12.6	13.7	12.5	12.4	12.6	11.5	10.7	10.2	10.0
9.5	9.4	10.4	10.8	12.0	14.4	13.6	14.5	13.0	12.0	14.0	14.1	12.2	12.1	9.5	10.4	12.7	13.2	13.2	12.6	14.6	12.4	13.0	14.9	15.9	14.6	14.0	15.7	14.5	13.8	15.8	13.7	11.5	10.5	11.2	10.9
12.9	10.0	11.4	11.7	9.4	10.8	15.6	17.1	19.8	15.8	15.3	16.3	16.0	15.7	13.4	10.8	12.6	15.0	15.9	16.6	15.3	10.3	13.9	16.4	18.1	18.3	21.5	19.8	20.7	18.7	18.8	13.7	13.4	11.1	10.9	13.1
16.0	12.7	15.9	9.6	5.1	4.7	11.7	18.2	21.3	18.6	18.9	18.5	16.2	11.8	10.3	9.3	6.6	13.8	13.2	10.7	7.7	8.7	12.3	13.9	11.0	13.8	18.4	17.4	18.3	18.4	16.7	16.7	14.1	14.4	17.4	18.5
7.5	6.0	7.9	5.1	5.0	3.4	5.1	18.3	18.0	20.5	17.6	12.1	10.6	9.8	4.8	5.1	8.1	14.4	18.4	18.2	8.5	11.3	7.0	6.5	7.7	12.8	18.5	17.0	15.2	16.6	15.9	14.3	13.0	14.0	13.0	9.3
11.4	13.1	10.9	11.2	11.0	8.4	12.0	20.1	25.0	21.2	18.0	17.0	12.6	9.7	7.7	7.7	18.6	20.0	22.4	18.7	16.4	15.6	11.5	10.0	8.4	15.5	16.3	19.4	17.9	16.3	19.6	16.4	17.7	13.8	11.5	10.5
15.2	18.3	21.0	17.7	17.2	17.1	17.5	13.7	17.6	20.6	24.3	23.5	20.1	16.7	19.3	18.3	22.9	19.8	21.9	22.6	23.7	18.2	11.9	17.0	22.1	22.0	20.7	22.6	21.0	20.8	18.5	20.4	19.6	20.4	23.7	21.8
16.4	13.1	13.3	9.3	4.3	4.6	3.6	4.4	5.2	6.2	17.0	21.0	17.6	12.2	10.6	5.5	2.8	5.6	5.9	13.0	17.3	11.0	12.3	17.3	20.9	20.2	17.7	20.4	15.8	15.2	11.5	15.5	14.8	20.7	21.3	18.8
15.4	15.6	18.3	14.2	10.9	8.7	4.8	3.6	3.8	3.3	8.4	9.6	9.2	7.9	5.3	4.3	4.2	4.6	4.0	6.8	6.6	6.4	5.9	8.1	8.2	11.0	14.7	9.0	7.8	6.7	6.4	8.8	9.0	14.4	18.8	16.3
9.5	11.5	16.1	22.2	22.9	19.0	13.3	9.2	9.4	7.1	7.2	11.0	17.6	15.5	11.8	12.8	13.3	8.3	5.7	7.2	8.7	11.7	9.1	8.3	6.3	5.3	12.2	14.9	12.7	11.6	11.2	12.1	11.4	15.0	18.7	14.0
15.2	14.1	12.2	16.6	19.6	19.7	16.8	16.9	17.4	17.6	17.7	16.6	19.3	20.3	17.7	19.5	20.7	17.7	13.5	10.2	11.1	11.8	11.1	13.9	13.7	12.7	12.6	14.1	13.7	13.3	12.0	12.5	11.9	16.7	18.9	16.6
14.8	13.4	12.2	13.0	12.3	14.3	15.9	14.7	14.3	15.1	17.0	17.8	17.0	16.9	14.5	13.8	13.9	14.9	16.2	15.4	13.5	12.7	14.4	13.4	13.0	14.9	12.9	12.2	12.7	12.0	12.5	14.1	14.6	14.0	14.7	15.6
12.3	12.0	12.2	11.5	10.3	10.7	12.6	12.5	13.5	12.6	13.0	14.2	13.7	13.1	11.6	10.6	10.4	11.8	12.4	13.0	12.6	12.3	14.2	13.9	14.5	14.0	12.5	12.1	11.2	10.9	11.4	12.8	13.3	12.9	13.0	13.0
12.1	12.3	10.8	10.8	11.1	12.0	12.7	12.2	11.9	10.5	10.6	12.4	10.9	9.2	7.2	6.7	7.1	7.2	8.0	8.0	9.2	10.2	11.7	12.6	12.3	13.2	13.6	12.4	10.8	10.2	11.1	10.0	9.4	8.2	9.2	11.6
7.7	8.9	9.6	14.2	11.6	12.0	11.1	10.9	11.7	11.3	11.2	12.0	10.8	9.5	7.7	7.6	7.5	8.2	7.7	6.7	7.2	6.6	5.5	4.3	6.0	6.5	3.9	3.8	3.5	3.5	3.5	2.7	3.5	5.0	8.4	8.0
8.2	8.6	9.4	9.4	8.7	9.8	9.7	7.4	6.7	5.0	6.2	8.6	9.8	7.5	7.6	5.9	5.3	4.5	3.6	3.6	3.7	3.8	4.3	3.7	2.2	2.0	3.2	3.6	2.8	2.4	2.9	2.6	3.3	5.2	8.1	8.0

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



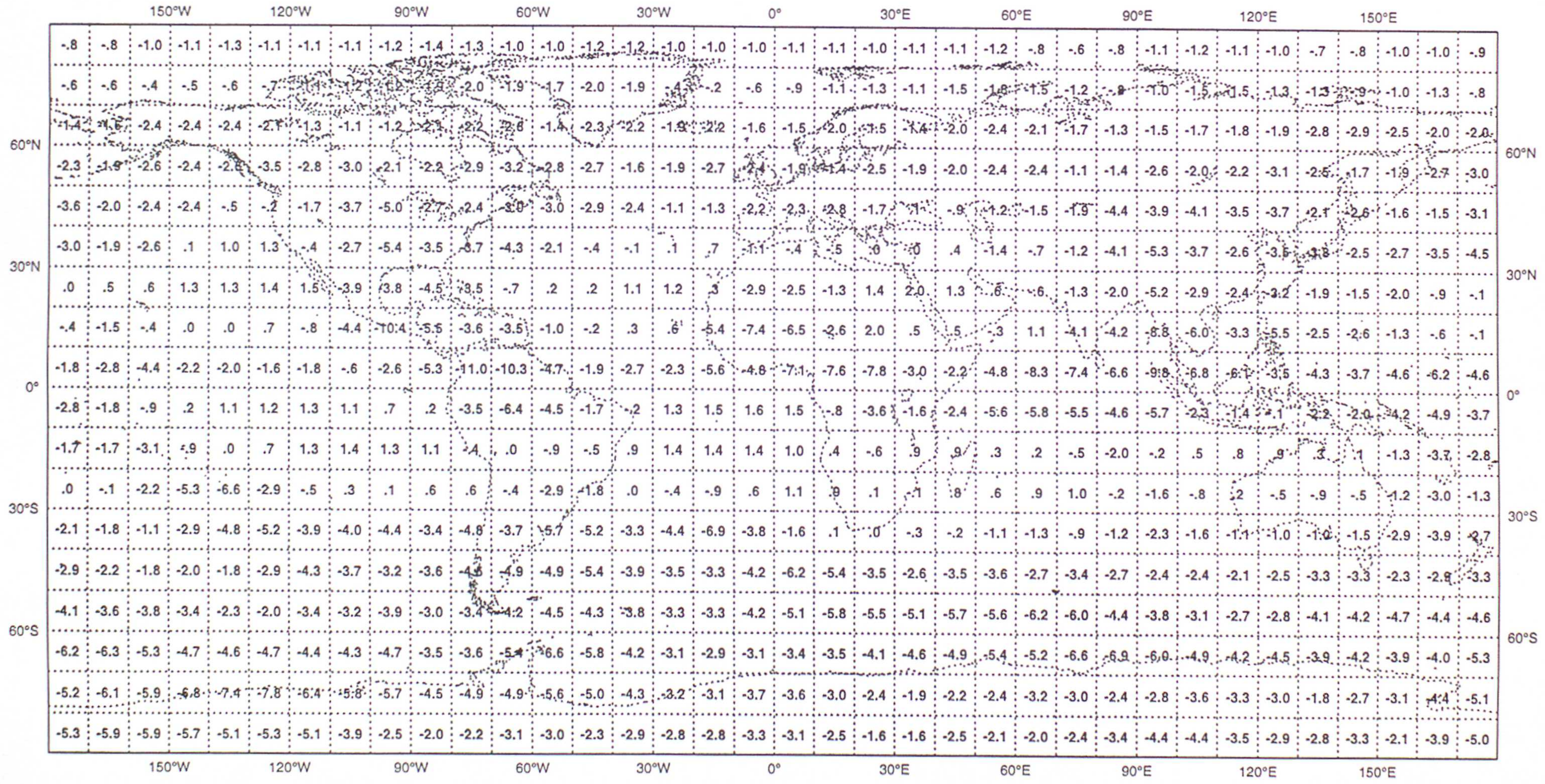
-1.0	-1.0	-.9	-1.0	-.9	-.8	-.8	-.9	-.9	-1.0	-.6	-.4	-.6	-.6	-.6	-.3	-.6	-.6	-.7	-.7	-.7	-.7	-.8	-.9	-.8	-.7	-.9	-1.1	-1.2	-1.1	-.9	-.7	-.8	-.9	-1.0	-1.0
-.5	-.6	-.5	-.5	-.5	-.5	-.8	-.9	-1.0	-1.5	-1.5	-1.4	-1.1	-1.3	-1.1	.0	.0	-.5	-1.0	-1.0	-1.0	-.8	-1.0	-1.8	-1.4	-1.4	-1.3	-1.4	-2.0	-1.9	-1.4	-1.2	-1.0	-.9	-1.1	-.8
-1.4	-1.8	-3.1	-2.6	-2.6	-2.5	-1.8	-1.5	-1.3	-1.8	-2.1	-2.5	-1.2	-1.6	-2.0	-2.1	-2.6	-2.3	-2.2	-2.8	-1.8	-1.6	-2.4	-3.3	-3.2	-2.8	-2.4	-2.4	-2.9	-2.9	-3.2	-3.9	-3.8	-3.2	-2.6	-2.4
-3.0	-2.5	-3.3	-3.4	-3.3	-4.4	-4.0	-3.9	-2.6	-2.6	-3.1	-4.0	-3.2	-3.2	-2.3	-2.8	-4.0	-3.7	-2.8	-2.3	-3.5	-3.3	-3.5	-3.9	-4.1	-2.5	-2.3	-3.7	-3.4	-3.6	-4.7	-3.7	-2.5	-2.7	-3.3	-3.8
-4.6	-3.0	-3.6	-4.1	-2.0	-1.1	-1.9	-4.2	-5.4	-3.3	-3.6	-3.8	-3.9	-4.1	-3.9	-2.6	-2.7	-3.1	-2.8	-2.6	-2.0	-.5	-2.2	-2.7	-3.2	-3.1	-5.0	-3.7	-4.7	-5.2	-5.2	-3.5	-3.3	-2.3	-2.6	-4.5
-4.3	-3.2	-4.1	-1.7	-.5	.0	.3	-3.1	-6.1	-5.2	-4.8	-5.6	-3.8	-1.9	-1.4	-1.2	-.7	-.8	-.3	-.4	-.1	-.5	-.2	-.4	.0	-2.0	-5.4	-6.3	-4.9	-4.7	-4.4	-4.8	-3.7	-4.3	-5.2	-5.9
-1.0	-.8	-1.0	-.8	-1.0	-.8	-.3	-4.6	-4.4	-5.8	-4.6	-2.1	-1.4	-1.2	-.3	-.5	-.5	-1.5	-2.3	-2.2	-.5	-.4	.0	.0	-.3	-2.3	-3.3	-6.6	-4.9	-4.4	-4.3	-2.8	-2.7	-3.2	-2.6	-1.2
-2.1	-2.6	-1.9	-1.9	-2.1	-1.5	-2.4	-5.8	-11.0	-6.8	-4.8	-5.1	-2.6	-1.7	-1.2	-1.4	-5.3	-6.2	-6.3	-4.1	-1.1	-1.0	-.7	-1.5	-1.0	-4.5	-5.1	-9.2	-6.1	-4.1	-6.2	-3.9	-4.1	-2.9	-2.2	-1.8
-3.5	-4.3	-5.8	-3.8	-3.7	-3.6	-4.0	-3.0	-4.7	-7.1	-11.9	-10.6	-6.2	-4.3	-5.0	-5.1	-7.4	-6.1	-8.7	-9.6	-10.3	-5.5	-3.2	-5.6	-9.5	-8.2	-7.3	-9.4	-7.4	-6.8	-5.1	-5.8	-5.4	-6.1	-7.2	-6.0
-3.6	-2.6	-2.2	-1.3	-.6	-.6	-.5	-.8	-1.1	-1.4	-6.5	-7.7	-4.8	-2.2	-1.8	-.8	-.4	-.8	-.8	-2.5	-4.3	-2.5	-3.7	-6.1	-7.2	-6.2	-5.2	-6.1	-3.6	-3.0	-2.3	-3.8	-3.6	-5.6	-6.2	-4.6
-3.8	-3.4	-5.0	-2.8	-1.8	-1.3	-.8	-.7	-.9	-1.1	-1.1	-1.2	-1.2	-.7	-.8	-.7	-.6	-.6	-.6	.0	-.5	-.8	-.9	-1.7	-1.8	-2.4	-3.6	-2.0	-1.3	-.8	.0	-.6	-1.3	-3.1	-5.5	-4.5
-1.8	-2.1	-4.5	-7.7	-9.3	-5.5	-2.9	-1.9	-2.0	-1.2	-1.0	-.9	-3.6	-2.9	-2.1	-2.4	-2.6	-1.3	-.8	.0	-.5	-2.2	-1.2	-1.3	-1.1	-.8	-2.4	-3.4	-2.4	-1.1	-1.3	-1.5	-1.4	-2.9	-5.5	-4.2
-4.1	-3.3	-2.7	-4.8	-6.5	-7.1	-5.8	-5.8	-6.0	-5.4	-6.2	-4.4	-6.8	-6.7	-4.8	-5.9	-8.2	-5.3	-3.6	-1.7	-1.4	-2.3	-2.0	-2.9	-3.3	-2.6	-2.6	-3.7	-3.2	-2.5	-2.2	-2.4	-2.3	-4.2	-5.3	-4.8
-4.1	-3.6	-3.3	-3.5	-3.2	-4.0	-4.9	-4.3	-3.9	-4.1	-5.2	-5.3	-5.4	-6.2	-4.6	-4.4	-4.1	-5.0	-7.0	-6.2	-4.7	-3.9	-4.6	-4.6	-4.0	-4.3	-3.7	-3.5	-3.6	-3.3	-3.5	-4.2	-4.2	-3.5	-4.2	-4.2
-4.6	-4.1	-4.2	-4.1	-3.3	-3.0	-4.1	-3.9	-4.6	-3.7	-3.6	-4.1	-4.5	-4.3	-3.7	-3.1	-3.2	-3.8	-4.7	-5.3	-5.2	-5.0	-5.3	-5.2	-5.8	-5.5	-4.5	-4.2	-3.6	-3.3	-3.5	-4.5	-4.5	-5.2	-4.9	-4.9
-5.3	-5.3	-4.4	-4.1	-4.2	-4.5	-4.5	-4.5	-4.7	-3.6	-3.4	-4.4	-4.8	-3.9	-2.6	-1.9	-1.9	-2.1	-2.7	-2.9	-3.4	-3.8	-3.8	-4.0	-3.8	-5.1	-5.1	-4.4	-3.5	-3.1	-3.1	-2.6	-2.8	-2.6	-3.0	-4.4
-3.1	-3.9	-3.9	-4.6	-5.0	-5.4	-4.4	-3.8	-3.5	-2.7	-2.6	-2.2	-2.9	-2.9	-2.2	-1.5	-1.3	-1.3	-1.2	-.9	-.7	-.5	-.5	-.4	-1.1	-1.1	-.5	-.3	-.5	-.3	-.2	.1	-.3	-.8	-2.1	-2.8
-2.2	-2.5	-2.7	-2.6	-2.4	-2.5	-2.2	-1.0	-.3	-.1	.0	-.2	-.2	.0	-.4	-.3	-.1	-.1	.1	.3	.6	.6	.5	.7	.7	.5	.0	-.4	-.2	.1	.2	.2	-.2	-.2	-1.3	-2.0

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



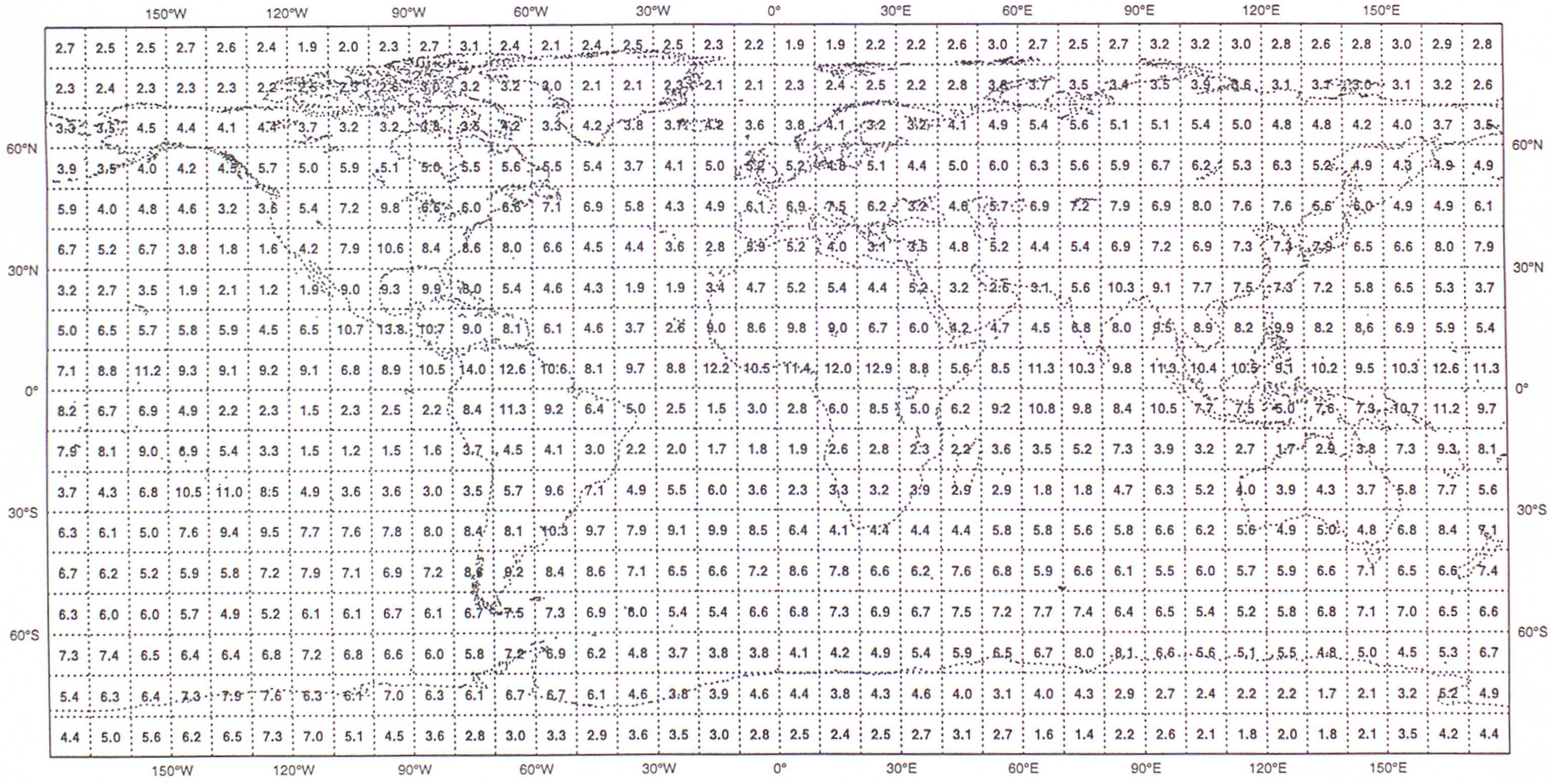
1.7	1.6	1.6	1.7	1.8	1.6	1.3	1.3	1.6	2.0	2.1	1.7	1.4	1.6	1.8	1.9	1.5	1.4	1.2	1.2	1.3	1.4	1.6	1.8	1.6	1.4	1.6	2.0	2.1	2.0	1.9	1.6	1.7	1.9	1.8	1.8
1.6	1.7	1.5	1.4	1.4	1.4	1.6	1.5	1.8	2.3	2.4	2.5	2.1	1.4	1.5	1.6	1.3	1.7	1.9	1.8	1.7	1.4	1.9	2.6	2.6	2.5	2.3	2.4	2.8	2.9	2.5	2.4	2.0	1.9	2.2	1.9
2.8	3.4	4.1	4.0	3.9	4.0	3.5	2.7	2.5	3.0	2.8	3.2	2.9	3.2	3.0	3.2	3.7	3.4	3.6	3.9	3.1	2.9	3.5	4.2	4.4	4.6	4.3	4.3	4.7	4.3	4.1	4.1	3.8	3.4	3.1	3.8
3.7	3.1	3.5	3.7	4.7	5.1	4.6	5.4	4.7	4.5	5.1	5.2	4.9	4.5	3.2	3.6	4.8	5.0	4.9	4.2	4.9	4.1	4.3	5.3	5.6	5.0	4.9	5.8	5.3	4.8	5.8	4.8	4.4	3.8	4.6	4.4
5.4	3.9	4.6	4.5	3.2	3.6	5.7	6.7	8.6	6.1	5.6	6.2	6.8	6.4	5.2	4.1	4.8	5.7	6.2	6.2	5.5	3.1	4.5	5.6	6.5	6.9	8.4	7.6	8.3	7.2	7.2	6.2	5.5	4.6	4.5	5.7
6.5	4.9	6.6	3.6	1.5	1.1	4.2	7.4	9.2	8.0	8.1	8.0	6.8	4.6	3.7	3.3	2.4	5.3	4.7	3.7	2.7	3.1	4.2	5.2	3.9	5.5	8.3	7.7	7.5	7.4	6.5	7.1	5.7	6.1	7.4	7.4
2.8	2.1	2.8	1.4	1.4	.8	1.3	8.1	7.9	9.2	7.4	4.8	4.1	3.8	1.5	1.7	2.8	4.8	6.5	6.8	2.9	4.0	2.3	2.1	2.6	5.0	8.1	7.7	7.1	7.1	6.6	6.4	5.3	5.5	5.2	3.3
4.6	5.4	4.6	4.6	4.7	3.4	5.1	9.4	12.2	9.6	7.8	7.1	5.1	4.0	3.1	2.9	8.1	8.2	8.7	7.6	6.2	5.8	3.9	3.8	3.5	6.4	6.8	9.0	7.8	6.9	8.6	7.2	7.7	6.0	4.8	4.2
6.7	8.1	9.7	8.1	8.0	8.0	7.9	6.3	8.2	9.9	12.1	11.2	9.3	7.5	9.1	8.4	10.8	8.6	10.0	10.4	11.4	8.1	4.4	6.9	10.2	9.7	9.4	10.4	9.2	9.4	8.3	9.5	9.0	9.7	11.3	10.2
7.3	5.6	5.9	4.0	1.5	1.7	1.1	1.5	1.8	2.3	7.9	9.6	7.8	5.2	4.5	2.2	.8	1.9	2.2	5.4	7.5	4.2	4.9	7.3	9.6	9.0	7.5	9.2	6.9	6.5	4.8	6.9	6.5	9.7	9.9	8.6
6.9	6.9	8.3	6.3	4.8	3.5	1.5	.8	.8	.8	3.3	3.6	3.5	2.8	1.6	1.3	1.1	1.0	1.0	2.1	2.1	1.7	1.7	2.8	2.9	4.7	6.5	3.4	2.8	2.2	1.8	3.0	3.2	6.3	8.4	7.4
3.3	4.1	6.8	10.0	10.7	8.6	5.1	3.3	3.3	2.3	2.6	3.9	8.2	6.6	4.5	5.1	5.4	2.8	1.6	2.5	3.1	4.0	2.9	2.8	1.8	1.4	4.6	5.7	4.9	3.8	4.0	4.3	3.7	5.8	8.3	5.9
6.1	5.5	4.7	7.3	8.9	9.1	7.2	7.2	6.9	7.1	7.5	6.7	8.9	8.6	7.0	8.1	9.1	7.5	5.6	3.5	3.7	4.1	3.7	5.4	5.4	4.7	4.8	5.7	5.4	4.8	4.1	4.3	4.2	6.2	7.9	6.5
6.0	5.4	4.6	5.2	5.0	6.2	6.8	5.6	5.4	5.7	6.7	7.4	7.1	7.1	5.9	5.5	5.6	6.1	7.2	6.7	5.7	5.1	6.2	5.6	4.8	5.5	5.3	4.8	4.8	4.5	4.6	5.2	5.4	5.2	5.6	6.0
4.8	4.7	4.9	4.7	3.9	4.1	5.0	4.9	5.4	4.7	4.7	5.4	5.4	5.4	4.6	3.8	4.0	4.9	5.4	5.5	5.5	5.3	6.0	5.7	6.2	5.8	5.2	5.1	4.2	4.1	4.4	5.1	5.3	5.3	5.1	5.1
5.4	5.5	4.8	4.7	4.7	5.0	5.3	5.2	5.0	4.2	4.0	5.0	4.8	4.4	3.3	2.6	2.8	2.7	2.8	2.8	3.5	3.8	4.2	4.6	4.9	5.9	6.0	4.9	4.3	3.8	4.1	3.4	3.5	3.1	3.8	5.0
3.7	4.4	4.4	4.9	5.2	5.1	4.6	4.6	5.3	4.6	4.4	4.6	4.7	4.4	3.3	2.4	2.2	2.6	2.5	2.1	2.5	2.7	2.3	1.7	2.5	2.7	1.6	1.0	1.1	1.0	1.0	.7	1.1	1.8	3.2	3.3
2.8	3.3	3.6	4.0	4.1	4.6	4.5	3.2	2.9	2.2	1.5	1.3	1.3	1.4	2.1	2.0	1.5	1.3	1.1	1.1	1.0	1.0	1.1	1.0	.7	.6	.8	1.0	1.0	.9	.8	.6	1.0	1.9	2.4	2.7

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



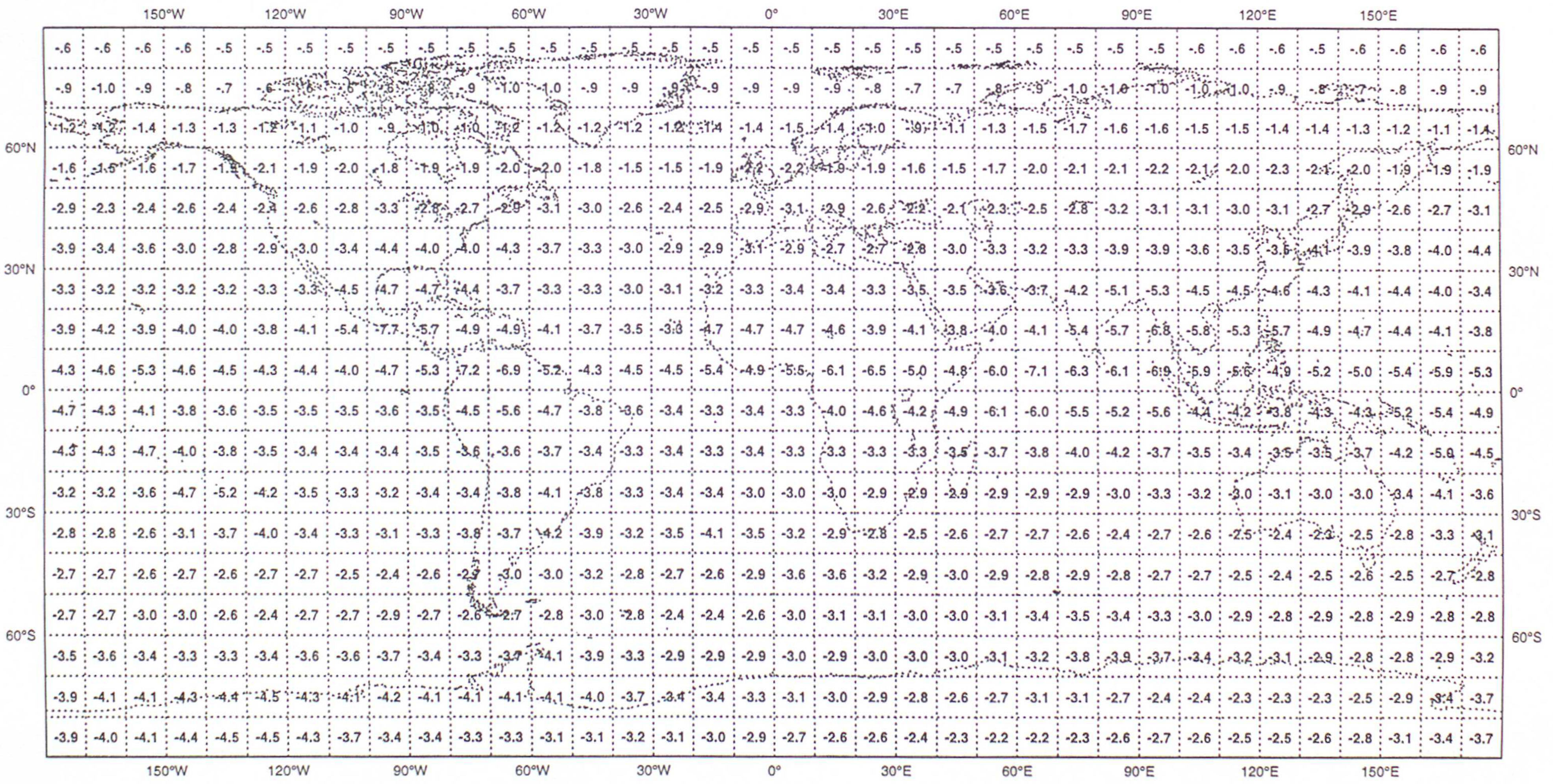
-.8	-.8	-1.0	-1.1	-1.3	-1.1	-1.1	-1.1	-1.2	-1.4	-1.3	-1.0	-1.0	-1.2	-1.2	-1.0	-1.0	-1.0	-1.1	-1.1	-1.0	-1.1	-1.1	-1.2	-.8	-.6	-.8	-1.1	-1.2	-1.1	-1.0	-.7	-.8	-1.0	-1.0	-.9
-.6	-.6	-.4	-.5	-.6	-.7	-1.1	-1.2	-1.2	-1.9	-2.0	-1.9	-1.7	-2.0	-1.9	-.4	-.2	-.6	-.9	-1.1	-1.3	-1.1	-1.5	-1.8	-1.5	-1.2	-.8	-1.0	-1.5	-1.5	-1.3	-1.3	-.9	-1.0	-1.3	-.8
-1.4	-1.6	-2.4	-2.4	-2.4	-2.1	-1.3	-1.1	-1.2	-2.1	-2.2	-2.6	-1.4	-2.3	-2.2	-1.9	-2.2	-1.6	-1.5	-2.0	-1.5	-1.4	-2.0	-2.4	-2.1	-1.7	-1.3	-1.5	-1.7	-1.8	-1.9	-2.8	-2.9	-2.5	-2.0	-2.0
-2.3	-1.9	-2.6	-2.4	-2.8	-3.5	-2.8	-3.0	-2.1	-2.2	-2.9	-3.2	-2.8	-2.7	-1.6	-1.9	-2.7	-2.4	-1.9	-1.4	-2.5	-1.9	-2.0	-2.4	-2.4	-1.1	-1.4	-2.6	-2.0	-2.2	-3.1	-2.5	-1.7	-1.9	-2.7	-3.0
-3.6	-2.0	-2.4	-2.4	-.5	-.2	-1.7	-3.7	-5.0	-2.7	-2.4	-3.0	-3.0	-2.9	-2.4	-1.1	-1.3	-2.2	-2.3	-2.8	-1.7	-.1	-.9	-1.2	-1.5	-1.9	-4.4	-3.9	-4.1	-3.5	-3.7	-2.1	-2.6	-1.6	-1.5	-3.1
-3.0	-1.9	-2.6	.1	1.0	1.3	-.4	-2.7	-5.4	-3.5	-3.7	-4.3	-2.1	-.4	-.1	.1	.7	-1.1	-.4	-.5	.0	.0	.4	-1.4	-.7	-1.2	-4.1	-5.3	-3.7	-2.6	-3.5	-3.8	-2.5	-2.7	-3.5	-4.5
.0	.5	.6	1.3	1.3	1.4	1.5	-3.9	-3.8	-4.5	-3.5	-.7	.2	.2	1.1	1.2	.3	-2.9	-2.5	-1.3	1.4	2.0	1.3	.6	-.6	-1.3	-2.0	-5.2	-2.9	-2.4	-3.2	-1.9	-1.5	-2.0	-.9	-.1
-.4	-1.5	-.4	.0	.0	.7	-.8	-4.4	-10.4	-5.5	-3.6	-3.5	-1.0	-.2	.3	.6	-5.4	-7.4	-6.5	-2.6	2.0	.5	.5	-.3	1.1	-4.1	-4.2	-8.8	-6.0	-3.3	-5.5	-2.5	-2.6	-1.3	-.6	-.1
-1.8	-2.8	-4.4	-2.2	-2.0	-1.6	-1.8	-.6	-2.6	-5.3	-11.0	-10.3	-4.7	-1.9	-2.7	-2.3	-5.6	-4.8	-7.1	-7.6	-7.8	-3.0	-2.2	-4.8	-8.3	-7.4	-6.6	-9.8	-6.8	-6.1	-3.5	-4.3	-3.7	-4.6	-6.2	-4.6
-2.8	-1.8	-.9	.2	1.1	1.2	1.3	1.1	.7	.2	-3.5	-6.4	-4.5	-1.7	-.2	1.3	1.5	1.6	1.5	-.8	-3.6	-1.6	-2.4	-5.6	-5.8	-5.5	-4.6	-5.7	-2.3	-1.4	-.1	-2.2	-2.0	-4.2	-4.9	-3.7
-1.7	-1.7	-3.1	-.9	.0	.7	1.3	1.4	1.3	1.1	-.4	.0	-.9	-.5	.9	1.4	1.4	1.4	1.0	.4	-.6	.9	.9	.3	.2	-.5	-2.0	-.2	.5	.8	.9	.3	.1	-1.3	-3.7	-2.8
.0	-.1	-2.2	-5.3	-6.6	-2.9	-.5	.3	.1	.6	.6	-.4	-2.9	-1.8	.0	-.4	-.9	.6	1.1	.9	.1	-.1	.8	.6	.9	1.0	-.2	-1.6	-.8	.2	-.5	-.9	-.5	-1.2	-3.0	-1.3
-2.1	-1.8	-1.1	-2.9	-4.8	-5.2	-3.9	-4.0	-4.4	-3.4	-4.8	-3.7	-5.7	-5.2	-3.3	-4.4	-6.9	-3.8	-1.6	.1	.0	-.3	-.2	-1.1	-1.3	-.9	-1.2	-2.3	-1.6	-1.1	-1.0	-1.0	-1.5	-2.9	-3.9	-2.7
-2.9	-2.2	-1.8	-2.0	-1.8	-2.9	-4.3	-3.7	-3.2	-3.6	-4.5	-4.9	-4.9	-5.4	-3.9	-3.5	-3.3	-4.2	-6.2	-5.4	-3.5	-2.6	-3.5	-3.6	-2.7	-3.4	-2.7	-2.4	-2.4	-2.1	-2.5	-3.3	-3.3	-2.3	-2.8	-3.3
-4.1	-3.6	-3.8	-3.4	-2.3	-2.0	-3.4	-3.2	-3.9	-3.0	-3.4	-4.2	-4.5	-4.3	-3.8	-3.3	-3.3	-4.2	-5.1	-5.8	-5.5	-5.1	-5.7	-5.6	-6.2	-6.0	-4.4	-3.8	-3.1	-2.7	-2.8	-4.1	-4.2	-4.7	-4.4	-4.6
-6.2	-6.3	-5.3	-4.7	-4.6	-4.7	-4.4	-4.3	-4.7	-3.5	-3.6	-5.4	-6.6	-5.8	-4.2	-3.1	-2.9	-3.1	-3.4	-3.5	-4.1	-4.6	-4.9	-5.4	-5.2	-6.6	-6.9	-6.0	-4.9	-4.2	-4.5	-3.9	-4.2	-3.9	-4.0	-5.3
-5.2	-6.1	-5.9	-6.8	-7.4	-7.8	-6.4	-5.8	-5.7	-4.5	-4.9	-4.9	-5.6	-5.0	-4.3	-3.2	-3.1	-3.7	-3.6	-3.0	-2.4	-1.9	-2.2	-2.4	-3.2	-3.0	-2.4	-2.8	-3.6	-3.3	-3.0	-1.8	-2.7	-3.1	-4.4	-5.1
-5.3	-5.9	-5.9	-5.7	-5.1	-5.3	-5.1	-3.9	-2.5	-2.0	-2.2	-3.1	-3.0	-2.3	-2.9	-2.8	-2.8	-3.3	-3.1	-2.5	-1.6	-1.6	-2.5	-2.1	-2.0	-2.4	-3.4	-4.4	-4.4	-3.5	-2.9	-2.8	-3.3	-2.1	-3.9	-5.0

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



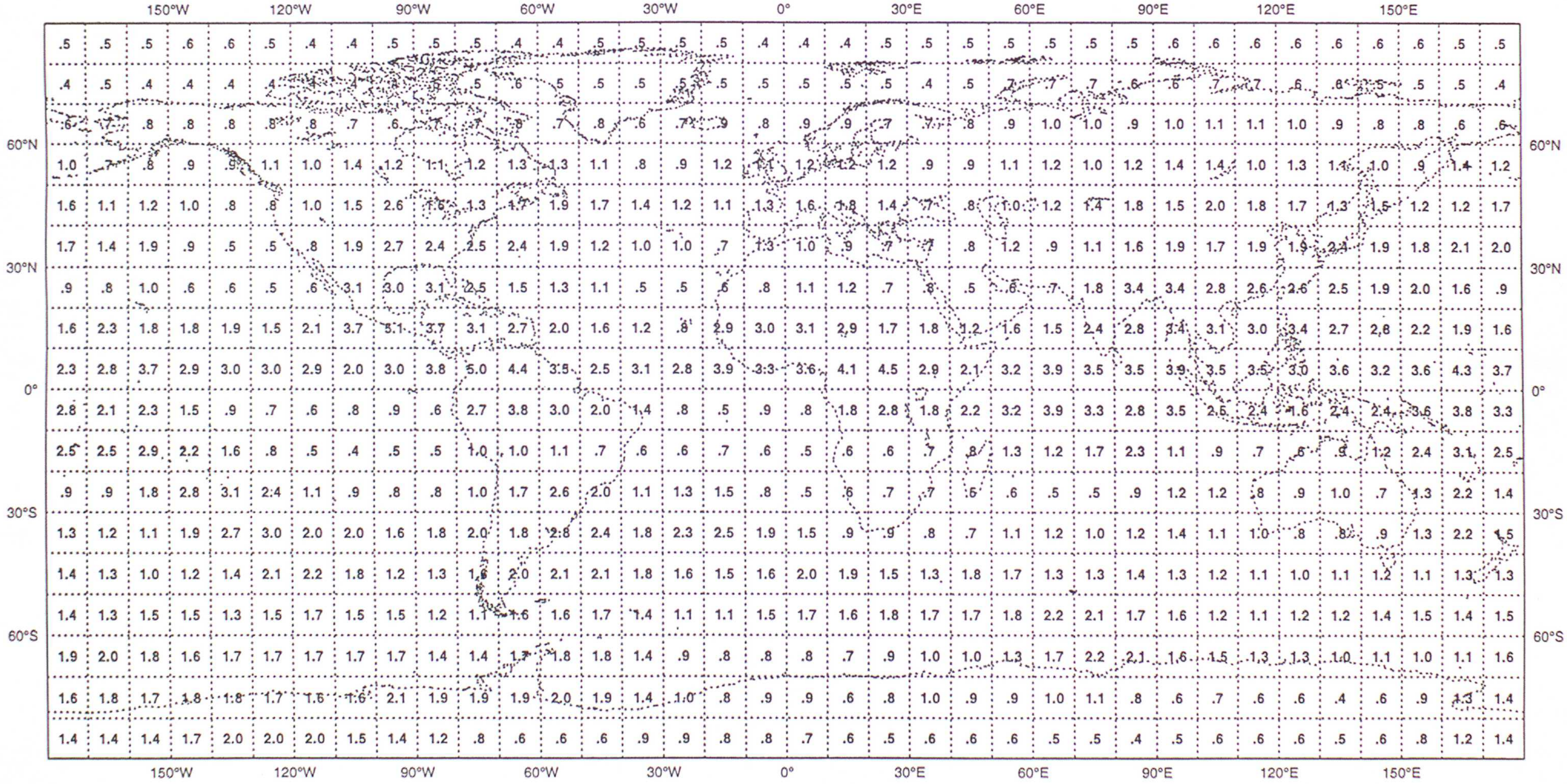
2.7	2.5	2.5	2.7	2.6	2.4	1.9	2.0	2.3	2.7	3.1	2.4	2.1	2.4	2.5	2.5	2.3	2.2	1.9	1.9	2.2	2.2	2.6	3.0	2.7	2.5	2.7	3.2	3.2	3.0	2.8	2.6	2.8	3.0	2.9	2.8
2.3	2.4	2.3	2.3	2.3	2.2	2.5	2.3	2.6	3.0	3.2	3.2	3.0	2.1	2.1	2.3	2.1	2.1	2.3	2.4	2.5	2.2	2.8	3.8	3.7	3.5	3.4	3.5	3.9	3.6	3.1	3.1	3.0	3.1	3.2	2.6
3.3	3.5	4.5	4.4	4.1	4.4	3.7	3.2	3.2	3.8	3.5	4.2	3.3	4.2	3.8	3.7	4.2	3.6	3.8	4.1	3.2	3.2	4.1	4.9	5.4	5.6	5.1	5.1	5.4	5.0	4.8	4.8	4.2	4.0	3.7	3.5
3.9	3.5	4.0	4.2	4.5	5.7	5.0	5.9	5.1	5.0	5.5	5.6	5.5	5.4	3.7	4.1	5.0	5.2	5.2	4.8	5.1	4.4	5.0	6.0	6.3	5.6	5.9	6.7	6.2	5.3	6.3	5.2	4.9	4.3	4.9	4.9
5.9	4.0	4.8	4.6	3.2	3.6	5.4	7.2	9.8	6.6	6.0	6.6	7.1	6.9	5.8	4.3	4.9	6.1	6.9	7.5	6.2	3.2	4.6	5.7	6.9	7.2	7.9	6.9	8.0	7.6	7.6	5.6	6.0	4.9	4.9	6.1
6.7	5.2	6.7	3.8	1.8	1.6	4.2	7.9	10.6	8.4	8.6	8.0	6.6	4.5	4.4	3.6	2.8	5.9	5.2	4.0	3.1	3.5	4.8	5.2	4.4	5.4	6.9	7.2	6.9	7.3	7.3	7.9	6.5	6.6	8.0	7.9
3.2	2.7	3.5	1.9	2.1	1.2	1.9	9.0	9.3	9.9	8.0	5.4	4.6	4.3	1.9	1.9	3.4	4.7	5.2	5.4	4.4	5.2	3.2	2.6	3.1	5.6	10.3	9.1	7.7	7.5	7.3	7.2	5.8	6.5	5.3	3.7
5.0	6.5	5.7	5.8	5.9	4.5	6.5	10.7	13.8	10.7	9.0	8.1	6.1	4.6	3.7	2.6	9.0	8.6	9.8	9.0	6.7	6.0	4.2	4.7	4.5	6.8	8.0	9.5	8.9	8.2	9.9	8.2	8.6	6.9	5.9	5.4
7.1	8.8	11.2	9.3	9.1	9.2	9.1	6.8	8.9	10.5	14.0	12.6	10.6	8.1	9.7	8.8	12.2	10.5	11.4	12.0	12.9	8.8	5.6	8.5	11.3	10.3	9.8	11.3	10.4	10.5	9.1	10.2	9.5	10.3	12.6	11.3
8.2	6.7	6.9	4.9	2.2	2.3	1.5	2.3	2.5	2.2	8.4	11.3	9.2	6.4	5.0	2.5	1.5	3.0	2.8	6.0	8.5	5.0	6.2	9.2	10.8	9.8	8.4	10.5	7.7	7.5	5.0	7.6	7.3	10.7	11.2	9.7
7.9	8.1	9.0	6.9	5.4	3.3	1.5	1.2	1.5	1.6	3.7	4.5	4.1	3.0	2.2	2.0	1.7	1.8	1.9	2.6	2.8	2.3	2.2	3.6	3.5	5.2	7.3	3.9	3.2	2.7	1.7	2.9	3.8	7.3	9.3	8.1
3.7	4.3	6.8	10.5	11.0	8.5	4.9	3.6	3.6	3.0	3.5	5.7	9.6	7.1	4.9	5.5	6.0	3.6	2.3	3.3	3.2	3.9	2.9	2.9	1.8	1.8	4.7	6.3	5.2	4.0	3.9	4.3	3.7	5.8	7.7	5.6
6.3	6.1	5.0	7.6	9.4	9.5	7.7	7.6	7.8	8.0	8.4	8.1	10.3	9.7	7.9	9.1	9.9	8.5	6.4	4.1	4.4	4.4	4.4	5.8	5.8	5.6	5.8	6.6	6.2	5.6	4.9	5.0	4.8	6.8	8.4	7.1
6.7	6.2	5.2	5.9	5.8	7.2	7.9	7.1	6.9	7.2	8.6	9.2	8.4	8.6	7.1	6.5	6.6	7.2	8.6	7.8	6.6	6.2	7.6	6.8	5.9	6.6	6.1	5.5	6.0	5.7	5.9	6.6	7.1	6.5	6.6	7.4
6.3	6.0	6.0	5.7	4.9	5.2	6.1	6.1	6.7	6.1	6.7	7.5	7.3	6.9	8.0	5.4	5.4	6.6	6.8	7.3	6.9	6.7	7.5	7.2	7.7	7.4	6.4	6.5	5.4	5.2	5.8	6.8	7.1	7.0	6.5	6.6
7.3	7.4	6.5	6.4	6.4	6.8	7.2	6.8	6.6	6.0	5.8	7.2	6.9	6.2	4.8	3.7	3.8	3.8	4.1	4.2	4.9	5.4	5.9	6.5	6.7	8.0	8.1	6.6	5.6	5.1	5.5	4.8	5.0	4.5	5.3	6.7
5.4	6.3	6.4	7.3	7.9	7.6	6.3	6.1	7.0	6.3	6.1	6.7	6.7	6.1	4.6	3.8	3.9	4.6	4.4	3.8	4.3	4.6	4.0	3.1	4.0	4.3	2.9	2.7	2.4	2.2	2.2	1.7	2.1	3.2	5.2	4.9
4.4	5.0	5.6	6.2	6.5	7.3	7.0	5.1	4.5	3.6	2.8	3.0	3.3	2.9	3.6	3.5	3.0	2.8	2.5	2.4	2.5	2.7	3.1	2.7	1.6	1.4	2.2	2.6	2.1	1.8	2.0	1.8	2.1	3.5	4.2	4.4

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



-.6	-.6	-.6	-.6	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.6	-.6	-.6	-.5	-.6	-.6	-.6	-.6
-.9	-1.0	-.9	-.8	-.7	-.6	-.6	-.6	-.6	-.8	-.9	-1.0	-1.0	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.8	-.7	-.7	-.8	-.9	-1.0	-1.0	-1.0	-1.0	-1.0	-.9	-.8	-.7	-.8	-.9	-.9
-1.2	-1.2	-1.4	-1.3	-1.3	-1.2	-1.1	-1.0	-.9	-1.0	-1.0	-1.2	-1.2	-1.2	-1.2	-1.2	-1.4	-1.4	-1.5	-1.4	-1.0	-.9	-1.1	-1.3	-1.5	-1.7	-1.6	-1.6	-1.5	-1.5	-1.4	-1.4	-1.3	-1.2	-1.1	-1.4
-1.6	-1.5	-1.6	-1.7	-1.5	-2.1	-1.9	-2.0	-1.8	-1.9	-1.9	-2.0	-2.0	-1.8	-1.5	-1.5	-1.9	-2.2	-2.2	-1.9	-1.9	-1.6	-1.5	-1.7	-2.0	-2.1	-2.1	-2.2	-2.1	-2.0	-2.3	-2.1	-2.0	-1.9	-1.9	-1.9
-2.9	-2.3	-2.4	-2.6	-2.4	-2.4	-2.6	-2.8	-3.3	-2.8	-2.7	-2.9	-3.1	-3.0	-2.6	-2.4	-2.5	-2.9	-3.1	-2.9	-2.6	-2.2	-2.1	-2.3	-2.5	-2.8	-3.2	-3.1	-3.1	-3.0	-3.1	-2.7	-2.9	-2.6	-2.7	-3.1
-3.9	-3.4	-3.6	-3.0	-2.8	-2.9	-3.0	-3.4	-4.4	-4.0	-4.0	-4.3	-3.7	-3.3	-3.0	-2.9	-2.9	-3.1	-2.9	-2.7	-2.7	-2.8	-3.0	-3.3	-3.2	-3.3	-3.9	-3.9	-3.6	-3.5	-3.5	-4.1	-3.9	-3.8	-4.0	-4.4
-3.3	-3.2	-3.2	-3.2	-3.2	-3.3	-3.3	-4.5	-4.7	-4.7	-4.4	-3.7	-3.3	-3.3	-3.0	-3.1	-3.2	-3.3	-3.4	-3.4	-3.3	-3.5	-3.5	-3.6	-3.7	-4.2	-5.1	-5.3	-4.5	-4.5	-4.6	-4.3	-4.1	-4.4	-4.0	-3.4
-3.9	-4.2	-3.9	-4.0	-4.0	-3.8	-4.1	-5.4	-7.7	-5.7	-4.9	-4.9	-4.1	-3.7	-3.5	-3.3	-4.7	-4.7	-4.7	-4.6	-3.9	-4.1	-3.8	-4.0	-4.1	-5.4	-5.7	-6.8	-5.8	-5.3	-5.7	-4.9	-4.7	-4.4	-4.1	-3.8
-4.3	-4.6	-5.3	-4.6	-4.5	-4.3	-4.4	-4.0	-4.7	-5.3	-7.2	-6.9	-5.2	-4.3	-4.5	-4.5	-5.4	-4.9	-5.5	-6.1	-6.5	-5.0	-4.8	-6.0	-7.1	-6.3	-6.1	-6.9	-5.9	-5.6	-4.9	-5.2	-5.0	-5.4	-5.9	-5.3
-4.7	-4.3	-4.1	-3.8	-3.6	-3.5	-3.5	-3.5	-3.6	-3.5	-4.5	-5.6	-4.7	-3.8	-3.6	-3.4	-3.3	-3.4	-3.3	-4.0	-4.6	-4.2	-4.9	-6.1	-6.0	-5.5	-5.2	-5.6	-4.4	-4.2	-3.8	-4.3	-4.3	-5.2	-5.4	-4.9
-4.3	-4.3	-4.7	-4.0	-3.8	-3.5	-3.4	-3.4	-3.4	-3.5	-3.6	-3.6	-3.7	-3.4	-3.3	-3.4	-3.3	-3.4	-3.3	-3.3	-3.3	-3.3	-3.5	-3.7	-3.8	-4.0	-4.2	-3.7	-3.5	-3.4	-3.5	-3.5	-3.7	-4.2	-5.0	-4.5
-3.2	-3.2	-3.6	-4.7	-5.2	-4.2	-3.5	-3.3	-3.2	-3.4	-3.4	-3.8	-4.1	-3.8	-3.3	-3.4	-3.4	-3.0	-3.0	-3.0	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9	-3.0	-3.3	-3.2	-3.0	-3.1	-3.0	-3.0	-3.4	-4.1	-3.6
-2.8	-2.8	-2.6	-3.1	-3.7	-4.0	-3.4	-3.3	-3.1	-3.3	-3.8	-3.7	-4.2	-3.9	-3.2	-3.5	-4.1	-3.5	-3.2	-2.9	-2.8	-2.5	-2.6	-2.7	-2.7	-2.6	-2.4	-2.7	-2.6	-2.5	-2.4	-2.3	-2.5	-2.8	-3.3	-3.1
-2.7	-2.7	-2.6	-2.7	-2.6	-2.7	-2.7	-2.5	-2.4	-2.6	-2.7	-3.0	-3.0	-3.2	-2.8	-2.7	-2.6	-2.9	-3.6	-3.6	-3.2	-2.9	-3.0	-2.9	-2.8	-2.9	-2.8	-2.7	-2.7	-2.5	-2.4	-2.5	-2.6	-2.5	-2.7	-2.8
-2.7	-2.7	-3.0	-3.0	-2.6	-2.4	-2.7	-2.7	-2.9	-2.7	-2.6	-2.7	-2.8	-3.0	-2.8	-2.4	-2.4	-2.6	-3.0	-3.1	-3.1	-3.0	-3.0	-3.1	-3.4	-3.5	-3.4	-3.3	-3.0	-2.9	-2.8	-2.9	-2.8	-2.9	-2.8	-2.8
-3.5	-3.6	-3.4	-3.3	-3.3	-3.4	-3.6	-3.6	-3.7	-3.4	-3.3	-3.7	-4.1	-3.9	-3.3	-2.9	-2.9	-2.9	-3.0	-2.9	-3.0	-3.0	-3.0	-3.1	-3.2	-3.8	-3.9	-3.7	-3.4	-3.2	-3.1	-2.9	-2.8	-2.8	-2.9	-3.2
-3.9	-4.1	-4.1	-4.3	-4.4	-4.5	-4.3	-4.1	-4.2	-4.1	-4.1	-4.1	-4.1	-4.0	-3.7	-3.4	-3.4	-3.3	-3.1	-3.0	-2.9	-2.8	-2.6	-2.7	-3.1	-3.1	-2.7	-2.4	-2.4	-2.3	-2.3	-2.3	-2.5	-2.9	-3.4	-3.7
-3.9	-4.0	-4.1	-4.4	-4.5	-4.5	-4.3	-3.7	-3.4	-3.4	-3.3	-3.3	-3.1	-3.1	-3.2	-3.1	-3.0	-2.9	-2.7	-2.6	-2.6	-2.4	-2.3	-2.2	-2.2	-2.3	-2.6	-2.7	-2.6	-2.5	-2.5	-2.6	-2.8	-3.1	-3.4	-3.7

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



.5	.5	.5	.6	.6	.5	.4	.4	.5	.5	.5	.4	.4	.5	.5	.5	.5	.4	.4	.4	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.5	.5
.4	.5	.4	.4	.4	.4	.4	.4	.6	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.7	.7	.7	.6	.6	.7	.7	.6	.6	.5	.5	.5	.4
.6	.7	.8	.8	.8	.8	.8	.7	.6	.7	.7	.8	.7	.8	.6	.7	.9	.8	.9	.9	.7	.7	.8	.9	1.0	1.0	.9	1.0	1.1	1.1	1.0	.9	.8	.8	.6	.6
1.0	.7	.8	.9	.9	1.1	1.0	1.4	1.2	1.1	1.2	1.3	1.3	1.1	.8	.9	1.2	1.1	1.2	1.2	1.2	.9	.9	1.1	1.2	1.0	1.2	1.4	1.4	1.0	1.3	1.4	1.0	.9	1.4	1.2
1.6	1.1	1.2	1.0	.8	.8	1.0	1.5	2.6	1.6	1.3	1.7	1.9	1.7	1.4	1.2	1.1	1.3	1.6	1.8	1.4	.7	.8	1.0	1.2	1.4	1.8	1.5	2.0	1.8	1.7	1.3	1.5	1.2	1.2	1.7
1.7	1.4	1.9	.9	.5	.5	.8	1.9	2.7	2.4	2.5	2.4	1.9	1.2	1.0	1.0	.7	1.3	1.0	.9	.7	.7	.8	1.2	.9	1.1	1.6	1.9	1.7	1.9	1.9	2.4	1.9	1.8	2.1	2.0
.9	.8	1.0	.6	.6	.5	.6	3.1	3.0	3.1	2.5	1.5	1.3	1.1	.5	.5	.6	.8	1.1	1.2	.7	.8	.5	.6	.7	1.8	3.4	3.4	2.8	2.6	2.6	2.5	1.9	2.0	1.6	.9
1.6	2.3	1.8	1.8	1.9	1.5	2.1	3.7	5.1	3.7	3.1	2.7	2.0	1.6	1.2	.8	2.9	3.0	3.1	2.9	1.7	1.8	1.2	1.6	1.5	2.4	2.8	3.4	3.1	3.0	3.4	2.7	2.8	2.2	1.9	1.6
2.3	2.8	3.7	2.9	3.0	3.0	2.9	2.0	3.0	3.8	5.0	4.4	3.5	2.5	3.1	2.8	3.9	3.3	3.6	4.1	4.5	2.9	2.1	3.2	3.9	3.5	3.5	3.9	3.5	3.5	3.0	3.6	3.2	3.6	4.3	3.7
2.8	2.1	2.3	1.5	.9	.7	.6	.8	.9	.6	2.7	3.8	3.0	2.0	1.4	.8	.5	.9	.8	1.8	2.8	1.8	2.2	3.2	3.9	3.3	2.8	3.5	2.5	2.4	1.6	2.4	2.4	3.6	3.8	3.3
2.5	2.5	2.9	2.2	1.6	.8	.5	.4	.5	.5	1.0	1.0	1.1	.7	.6	.6	.7	.6	.5	.6	.6	.7	.8	1.3	1.2	1.7	2.3	1.1	.9	.7	.6	.9	1.2	2.4	3.1	2.5
.9	.9	1.8	2.8	3.1	2.4	1.1	.9	.8	.8	1.0	1.7	2.6	2.0	1.1	1.3	1.5	.8	.5	.6	.7	.7	.5	.6	.5	.5	.9	1.2	1.2	.8	.9	1.0	.7	1.3	2.2	1.4
1.3	1.2	1.1	1.9	2.7	3.0	2.0	2.0	1.6	1.8	2.0	1.8	2.8	2.4	1.8	2.3	2.5	1.9	1.5	.9	.9	.8	.7	1.1	1.2	1.0	1.2	1.4	1.1	1.0	.8	.8	.9	1.3	2.2	1.5
1.4	1.3	1.0	1.2	1.4	2.1	2.2	1.8	1.2	1.3	1.6	2.0	2.1	2.1	1.8	1.6	1.5	1.6	2.0	1.9	1.5	1.3	1.8	1.7	1.3	1.3	1.4	1.3	1.2	1.1	1.0	1.1	1.2	1.1	1.3	1.3
1.4	1.3	1.5	1.5	1.3	1.5	1.7	1.5	1.5	1.2	1.1	1.6	1.6	1.7	1.4	1.1	1.1	1.5	1.7	1.6	1.8	1.7	1.7	1.8	2.2	2.1	1.7	1.6	1.2	1.1	1.2	1.2	1.4	1.5	1.4	1.5
1.9	2.0	1.8	1.6	1.7	1.7	1.7	1.7	1.7	1.4	1.4	1.7	1.8	1.8	1.4	.9	.8	.8	.8	.7	.9	1.0	1.0	1.3	1.7	2.2	2.1	1.6	1.5	1.3	1.3	1.0	1.1	1.0	1.1	1.6
1.6	1.8	1.7	1.8	1.8	1.7	1.6	1.6	2.1	1.9	1.9	1.9	2.0	1.9	1.4	1.0	.8	.9	.9	.6	.8	1.0	.9	.9	1.0	1.1	.8	.6	.7	.6	.6	.4	.6	.9	1.3	1.4
1.4	1.4	1.4	1.7	2.0	2.0	2.0	1.5	1.4	1.2	.8	.6	.6	.6	.9	.9	.8	.8	.7	.6	.5	.6	.6	.6	.5	.5	.4	.5	.6	.6	.6	.5	.6	.8	1.2	1.4

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

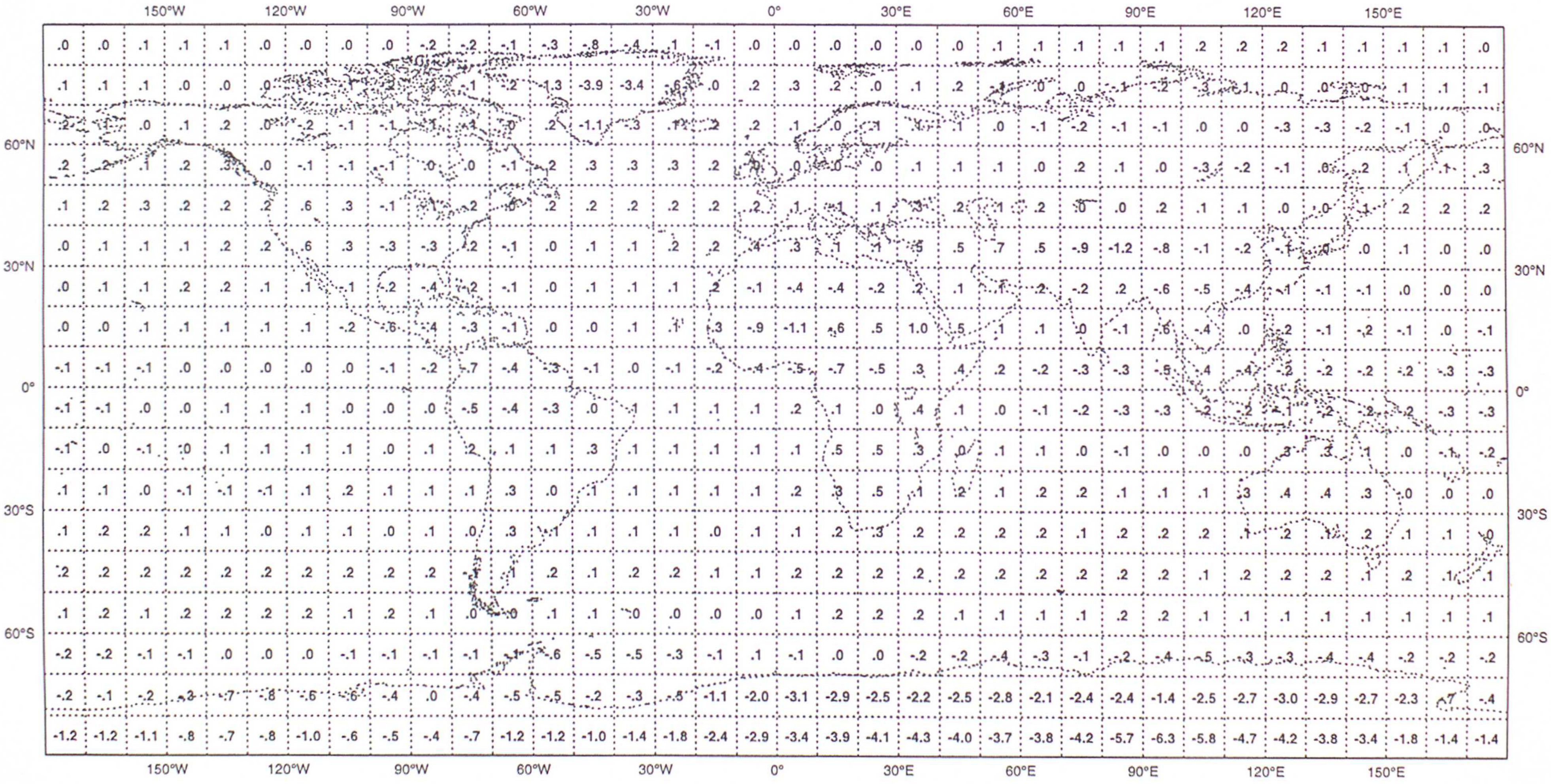

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.0 .0 .1 .1 .1 .0 .0 .0 .0 -.2 -.2 -.1 -.3 -.8 -.4 .1 -.1 .0 .0 .0 .0 .0 .0 .1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .0
.1 .1 .1 .0 .0 .0 .1 .1 .2 .3 -.1 -.2 -1.3 -3.9 -3.4 -.6 .0 .2 .3 .2 .0 .1 .2 -.1 .0 .0 -.1 -.2 -.3 -.1 .0 .0 .0 .1 .1 .1
.2 .1 .0 .1 .2 .0 -.2 -.1 -.1 -.1 .1 .0 .2 -1.1 -.3 .1 .2 .2 .1 .0 .1 .1 .1 .0 -.1 -.2 -.1 -.1 .0 .0 -.3 -.3 -.2 -.1 .0 .0
.2 .2 .1 .2 .3 .0 -.1 -.1 -.1 .0 .0 -.1 .2 .3 .3 .3 .2 .2 .0 .0 .0 .1 .1 .1 .0 .2 .1 .0 -.3 -.2 -.1 .0 .2 .1 .1 .3
.1 .2 .3 .2 .2 .2 .6 .3 -.1 -.1 -.2 .0 .2 .2 .2 .2 .2 .2 .1 -.1 .1 .3 .2 .1 .2 .0 .0 .2 .1 .1 .0 .0 .1 .2 .2 .2
.0 .1 .1 .1 .2 .2 .6 .3 -.3 -.3 .2 -.1 .0 .1 .1 .2 .2 .4 .3 .1 .1 .5 .5 .7 .5 -.9 -1.2 -.8 -.1 -.2 -.1 .0 .0 .1 .0 .0
.0 .1 .1 .2 .2 .1 .1 -.1 -.2 -.4 -.2 -.1 .0 .1 .1 .1 .2 -.1 -.4 -.4 -.2 .2 .1 .1 .2 -.2 .2 -.6 -.5 -.4 -.1 -.1 -.1 .0 .0 .0
.0 .0 .1 .1 .1 .1 .1 -.2 -.6 -.4 -.3 -.1 .0 .0 .1 .1 .3 -.9 -1.1 .6 .5 1.0 .5 .1 .1 .0 -.1 -.6 -.4 .0 -.2 -.1 -.2 -.1 .0 -.1
-.1 -.1 -.1 .0 .0 .0 .0 .0 -.1 -.2 -.7 -.4 -.3 -.1 .0 -.1 -.2 -.4 -.5 -.7 -.5 .3 .4 .2 -.2 -.3 -.3 -.5 -.4 -.4 -.2 -.2 -.2 -.2 -.3 -.3
-.1 -.1 .0 .0 .1 .1 .1 .0 .0 .0 -.5 -.4 -.3 .0 .1 .1 .1 .1 .2 .1 .0 .4 .1 .0 -.1 -.2 -.3 -.3 -.2 -.2 -.1 -.2 -.2 -.2 -.3 -.3
-.1 .0 -.1 .0 .1 .1 .1 .1 .0 .1 .2 .1 .1 .3 .1 .1 .1 .1 .1 .1 .5 .5 .3 .0 .1 .1 .0 -.1 .0 .0 .0 .3 .3 .1 .0 -.1 -.2
.1 .1 .0 -.1 -.1 -.1 .1 .2 .1 .1 .1 .3 .0 .1 .1 .1 .1 .1 .2 .3 .5 .1 .2 .1 .2 .2 .1 .1 .1 .3 .4 .4 .3 .0 .0 .0
.1 .2 .2 .1 .1 .0 .1 .1 .0 .1 .0 .3 .1 .1 .1 .1 .0 .1 .1 .2 .3 .2 .2 .2 .2 .1 .2 .2 .2 .1 .2 .1 .2 .1 .1 .0
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 -.1 .1 .2 .1 .2 .2 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .2 .2 .1 .2 .1 .1
.1 .2 .1 .2 .2 .2 .2 .1 .2 .1 .0 .0 .1 .1 .0 .0 .0 .0 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .1 .1 .1 .1
-.2 -.2 -.1 -.1 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 -.6 -.5 -.5 -.3 -.1 .1 -.1 .0 .0 -.2 -.2 -.4 -.3 -.1 -.2 -.4 -.5 -.3 -.3 -.4 -.4 -.2 -.2 -.2
-.2 -.1 -.2 -.3 -.7 -.8 -.6 -.6 -.4 .0 -.4 -.5 -.5 -.2 -.3 -.8 -1.1 -2.0 -3.1 -2.9 -2.5 -2.2 -2.5 -2.8 -2.1 -2.4 -2.4 -1.4 -2.5 -2.7 -3.0 -2.9 -2.7 -2.3 -.7 -.4
-1.2 -1.2 -1.1 -.8 -.7 -.8 -1.0 -.6 -.5 -.4 -.7 -1.2 -1.2 -1.0 -1.4 -1.8 -2.4 -2.9 -3.4 -3.9 -4.1 -4.3 -4.0 -3.7 -3.8 -4.2 -5.7 -6.3 -5.8 -4.7 -4.2 -3.8 -3.4 -1.8 -1.4 -1.4

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

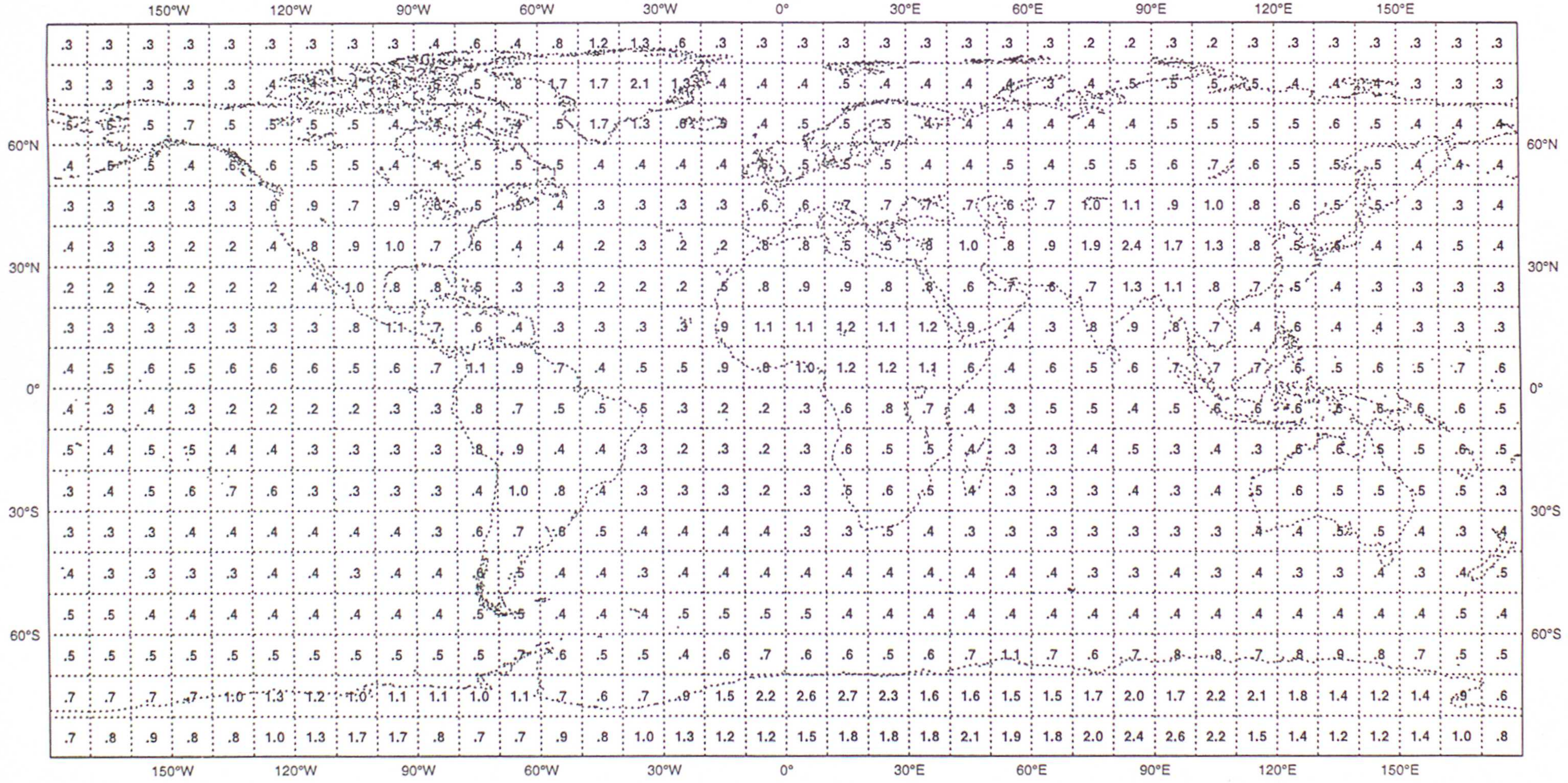

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .6 .4 .8 1.2 1.3 .6 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .2 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .4 .4 .4 .8 .5 .5 .8 1.7 1.7 2.1 1.3 .4 .4 .4 .5 .4 .4 .4 .4 .3 .4 .5 .5 .5 .5 .4 .4 .4 .3 .3 .3
.5 .6 .5 .7 .5 .5 .5 .5 .4 .4 .4 .4 .5 1.7 1.3 .6 .9 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .6 .5 .4 .4 .4
.4 .6 .5 .4 .6 .6 .5 .5 .4 .4 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .5 .4 .5 .5 .6 .7 .6 .5 .5 .5 .4 .4 .4
.3 .3 .3 .3 .3 .6 .9 .7 .9 .8 .5 .5 .4 .3 .3 .3 .3 .6 .6 .7 .7 .7 .7 .6 .7 1.0 1.1 .9 1.0 .8 .6 .5 .5 .3 .3 .4
.4 .3 .3 .2 .2 .4 .8 .9 1.0 .7 .6 .4 .4 .2 .3 .2 .2 .8 .8 .5 .5 .8 1.0 .8 .9 1.9 2.4 1.7 1.3 .8 .5 .6 .4 .4 .5 .4
.2 .2 .2 .2 .2 .2 .4 1.0 .8 .8 .5 .3 .3 .2 .2 .2 .5 .8 .9 .9 .8 .8 .6 .7 .6 .7 1.3 1.1 .8 .7 .5 .4 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .8 1.1 .7 .6 .4 .3 .3 .3 .3 .9 1.1 1.1 1.2 1.1 1.2 .9 .4 .3 .8 .9 .8 .7 .4 .6 .4 .4 .3 .3 .3
.4 .5 .6 .5 .6 .6 .6 .5 .6 .7 1.1 .9 .7 .4 .5 .5 .9 .8 1.0 1.2 1.2 1.1 .6 .4 .6 .5 .6 .7 .7 .7 .6 .5 .6 .5 .7 .6
.4 .3 .4 .3 .2 .2 .2 .2 .3 .3 .8 .7 .5 .5 .5 .3 .2 .2 .3 .6 .8 .7 .4 .3 .5 .5 .4 .5 .6 .6 .6 .5 .6 .6 .6 .5
.5 .4 .5 .5 .4 .4 .3 .3 .3 .3 .8 .9 .4 .4 .3 .2 .3 .2 .3 .6 .5 .5 .4 .3 .3 .4 .5 .3 .4 .3 .6 .6 .5 .5 .6 .5
.3 .4 .5 .6 .7 .6 .3 .3 .3 .3 .4 1.0 .8 .4 .3 .3 .3 .2 .3 .5 .6 .5 .4 .3 .3 .3 .4 .3 .4 .5 .6 .5 .5 .5 .5 .3
.3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .6 .7 .8 .5 .4 .4 .4 .4 .3 .3 .5 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .5 .4 .3 .4
.4 .3 .3 .3 .3 .4 .4 .3 .4 .4 .6 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .3 .3 .4 .3 .4 .5
.5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .7 .6 .5 .5 .4 .6 .7 .6 .6 .5 .6 .7 1.1 .7 .6 .7 .8 .8 .7 .8 .9 .8 .7 .5 .5
.7 .7 .7 .7 1.0 1.3 1.2 1.0 1.1 1.1 1.0 1.1 .7 .6 .7 .9 1.5 2.2 2.6 2.7 2.3 1.6 1.6 1.5 1.5 1.7 2.0 1.7 2.2 2.1 1.8 1.4 1.2 1.4 .9 .6
.7 .8 .9 .8 .8 1.0 1.3 1.7 1.7 .8 .7 .7 .9 .8 1.0 1.3 1.2 1.2 1.5 1.8 1.8 1.8 2.1 1.9 1.8 2.0 2.4 2.6 2.2 1.5 1.4 1.2 1.2 1.4 1.0 .8

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

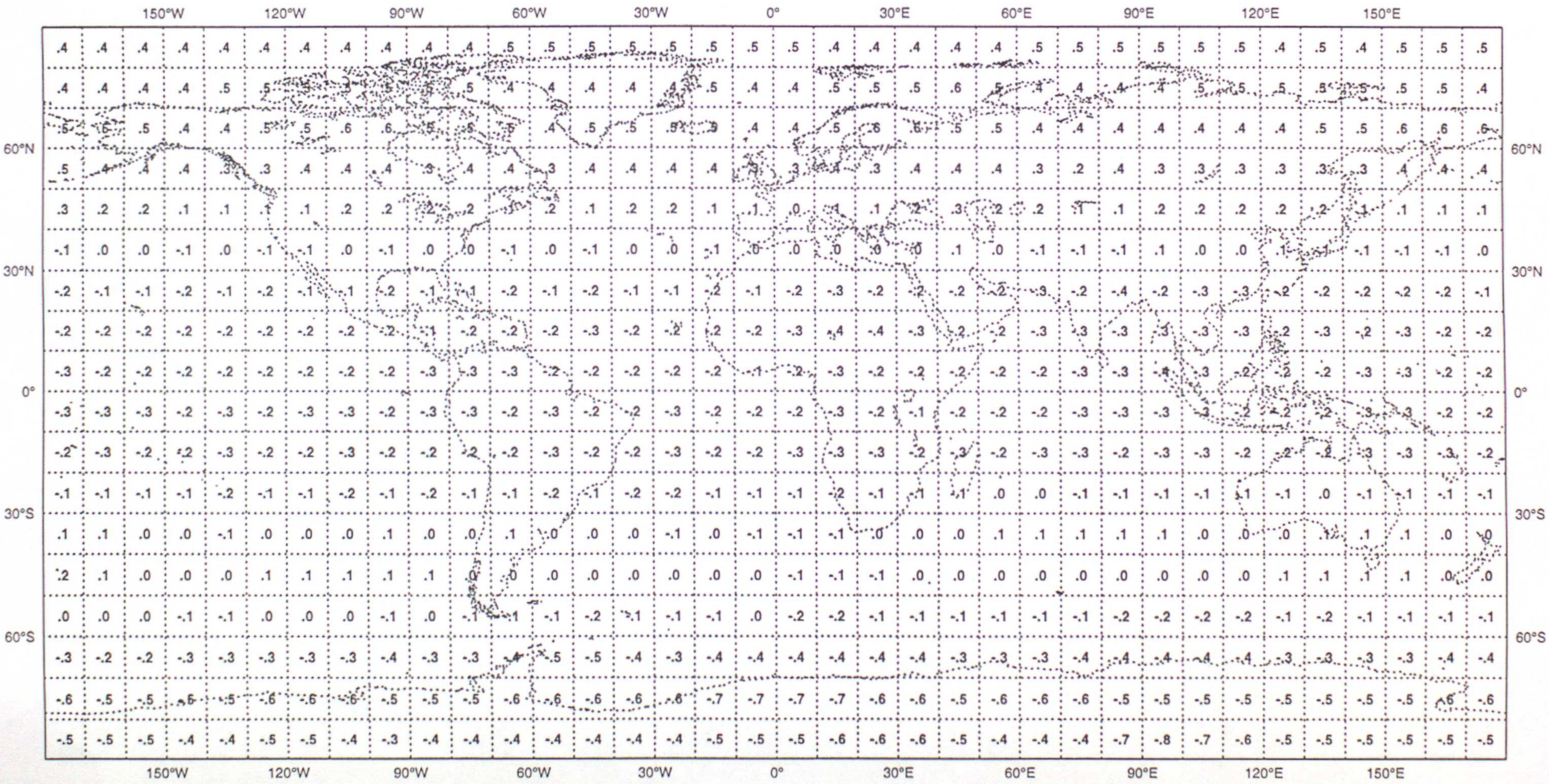

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5
.4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .4 .4 .5 .5 .5 .6 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4
.5 .5 .5 .4 .4 .5 .5 .6 .6 .5 .5 .5 .4 .5 .5 .5 .5 .4 .4 .5 .6 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .6 .6 .6
.5 .4 .4 .4 .3 .3 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .3 .3 .4 .3 .4 .4 .4 .3 .2 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4
.3 .2 .2 .1 .1 .1 .1 .2 .2 .2 .2 .1 .2 .1 .2 .2 .1 .1 .0 .1 .1 .2 .3 .2 .2 .1 .1 .2 .2 .2 .2 .2 .1 .1 .1 .1
-.1 .0 .0 -.1 .0 -.1 -.1 .0 -.1 .0 .0 -.1 .0 -.1 .0 .0 -.1 .0 .0 .0 .0 .0 .1 .0 -.1 -.1 -.1 .1 .0 .0 .1 -.1 -.1 -.1 -.1 .0
-.2 -.1 -.1 -.2 -.1 -.2 -.1 -.1 -.2 -.1 -.1 -.2 -.1 -.2 -.1 -.1 -.2 -.1 -.2 -.3 -.2 -.2 -.2 -.2 -.3 -.2 -.4 -.2 -.3 -.3 -.2 -.2 -.2 -.2 -.2 -.1
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.3 -.4 -.4 -.3 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.2 -.3 -.2 -.2
-.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.3 -.2 -.2 -.2 -.3 -.3 -.2 -.2
-.3 -.3 -.3 -.2 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.2 -.3 -.2 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.3 -.2 -.2
-.2 -.3 -.2 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.3 -.3 -.3 -.2 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.2 -.2 -.2 -.3 -.3 -.3 -.2
-.1 -.1 -.1 -.1 -.2 -.1 -.1 -.2 -.1 -.2 -.1 -.1 -.2 -.1 -.2 -.2 -.1 -.1 -.1 -.2 -.1 -.1 -.1 .0 .0 -.1 -.1 -.1 -.1 .1 -.1 .0 -.1 -.1 -.1 -.1
.1 .1 .0 .0 -.1 .0 .0 .0 .1 .0 .0 .1 .0 .0 .0 -.1 .0 -.1 -.1 -.1 .0 .0 .0 .1 .1 .1 .1 .1 .0 .0 .0 .1 .1 .1 .0 .0
.2 .1 .0 .0 .0 .1 .1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 -.1 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .1 .1 .0 .0
.0 .0 .0 -.1 -.1 .0 .0 .0 -.1 .0 -.1 -.1 -.1 -.2 -.1 -.1 -.1 .0 -.2 -.2 -.1 -.1 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.2 -.1 -.2 -.1 -.1 -.1 -.1
-.3 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.3 -.4 -.5 -.5 -.4 -.3 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.3 -.3 -.4 -.4
-.6 -.5 -.5 -.6 -.5 -.6 -.6 -.6 -.5 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.7 -.6 -.6 -.5 -.6 -.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6
-.5 -.5 -.5 -.4 -.4 -.5 -.5 -.4 -.3 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.5 -.5 -.5 -.6 -.6 -.6 -.5 -.4 -.4 -.4 -.7 -.8 -.7 -.6 -.5 -.5 -.5 -.5 -.5 -.5

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

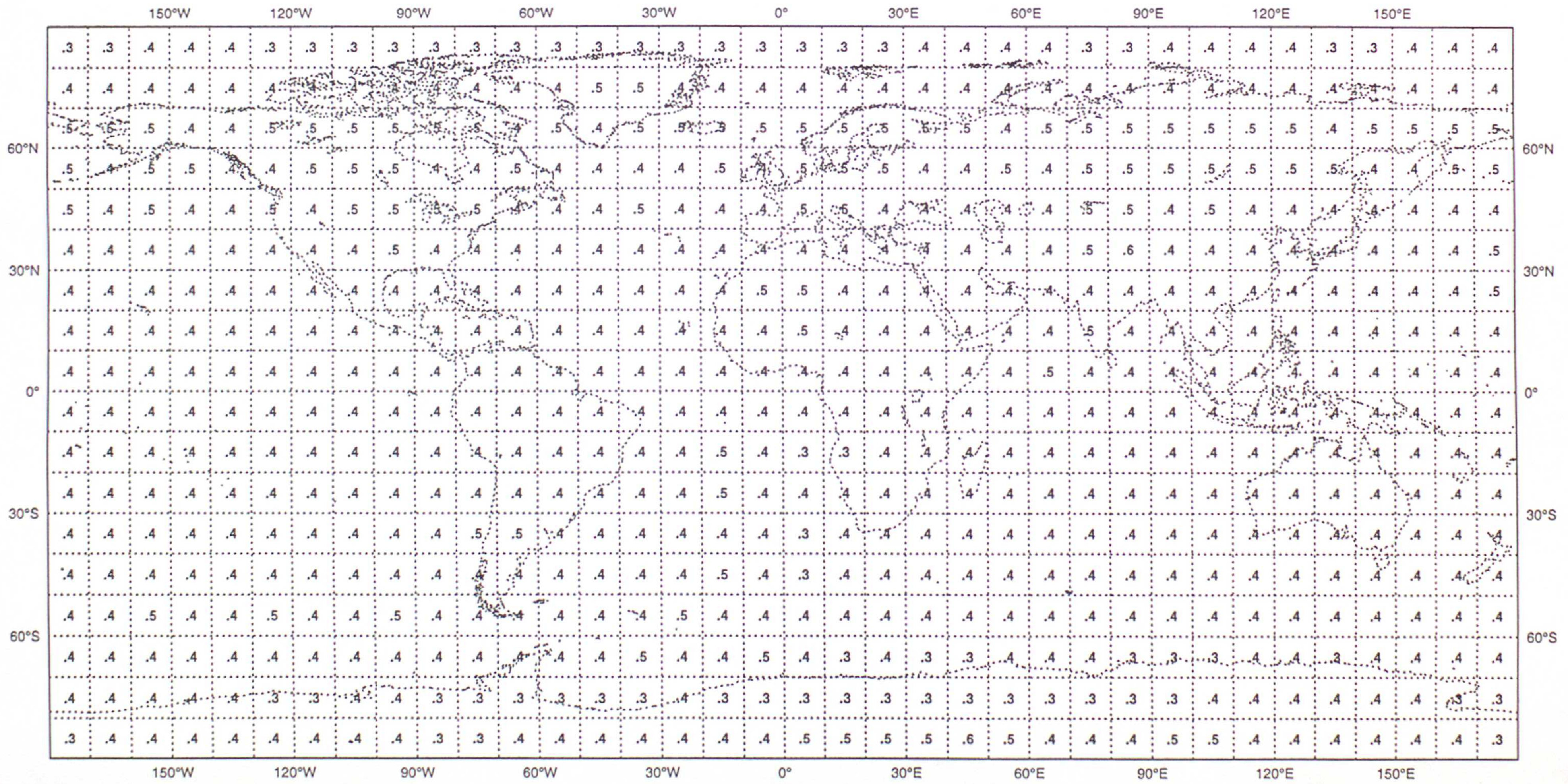

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .3 .3 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5
.5 .4 .5 .5 .4 .4 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .5 .4 .5 .5 .5 .4 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5
.5 .4 .5 .4 .4 .5 .4 .5 .5 .5 .5 .4 .4 .4 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .6 .4 .4 .4 .4 .4 .4 .4 .4 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .5 .4 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .5 .4 .3 .4 .3 .3 .4 .4 .4 .3 .3 .3 .4 .4 .3 .4 .4 .4 .4
.4 .4 .4 .4 .4 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3
.3 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .6 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .3

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

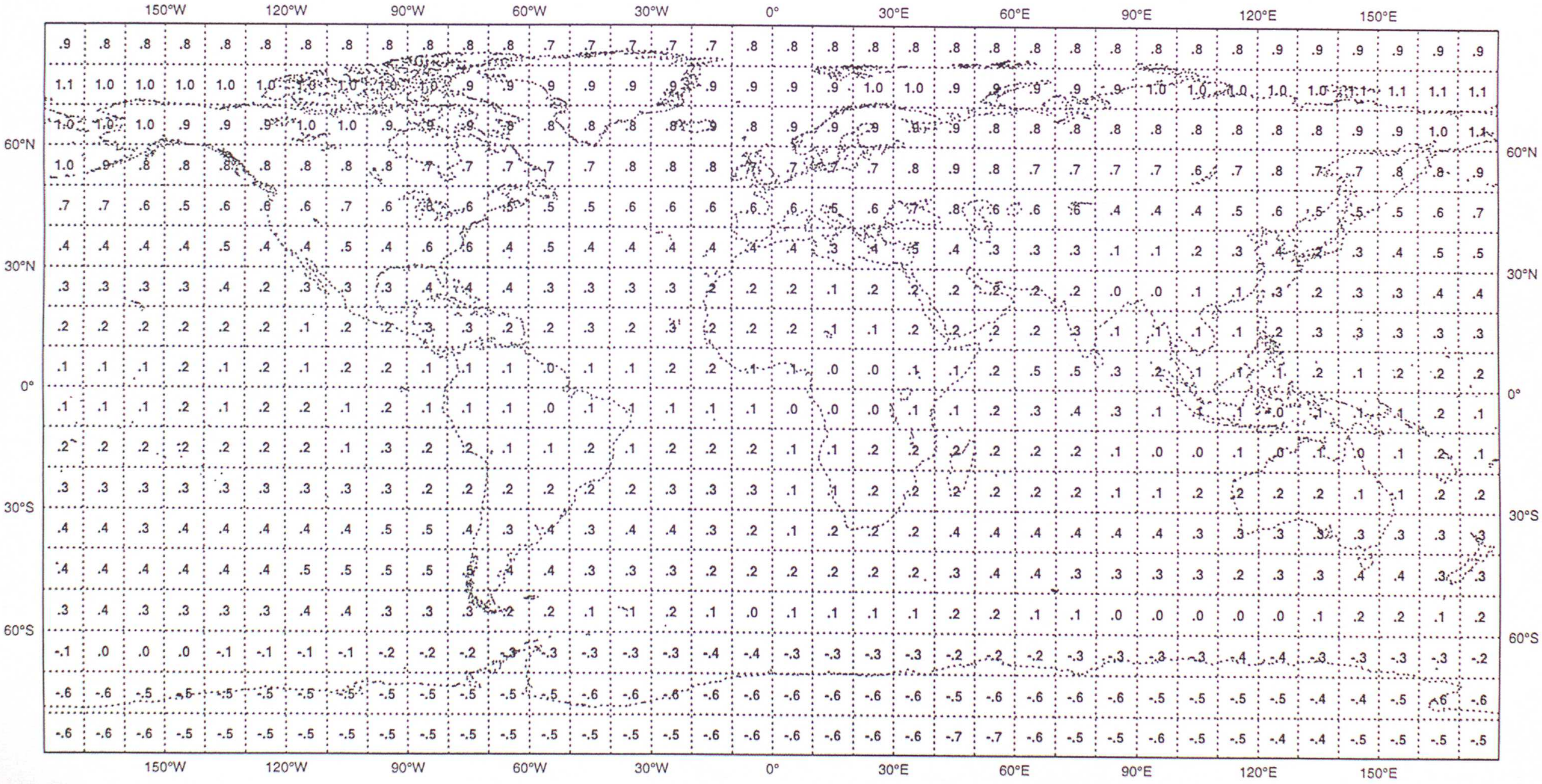

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9
1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 1.0 1.0 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1
1.0 1.0 1.0 .9 .9 .9 1.0 1.0 .9 .9 .9 .8 .8 .8 .8 .8 .9 .8 .9 .9 .9 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 1.0 1.1
1.0 .9 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .7 .7 .7 .7 .8 .9 .8 .7 .7 .7 .7 .6 .7 .8 .7 .7 .8 .8 .9
.7 .7 .6 .5 .6 .6 .6 .7 .6 .6 .6 .5 .5 .5 .6 .6 .6 .6 .6 .5 .6 .7 .8 .6 .6 .6 .4 .4 .4 .5 .6 .5 .5 .5 .6 .7
.4 .4 .4 .4 .5 .4 .4 .5 .4 .6 .6 .4 .5 .4 .4 .4 .4 .4 .4 .3 .4 .5 .4 .3 .3 .3 .1 .1 .2 .3 .4 .2 .3 .4 .5 .5
.3 .3 .3 .3 .4 .2 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .0 .0 .1 .1 .3 .2 .3 .3 .4 .4
.2 .2 .2 .2 .2 .2 .1 .2 .2 .3 .3 .2 .2 .3 .2 .3 .2 .2 .2 .1 .1 .2 .2 .2 .2 .3 .1 .1 .1 .1 .2 .3 .3 .3 .3 .3
.1 .1 .1 .2 .1 .2 .1 .2 .2 .1 .1 .1 .0 .1 .1 .2 .2 .1 .1 .0 .0 .1 .1 .2 .5 .5 .3 .2 .1 .1 .1 .2 .1 .2 .2 .2
.1 .1 .1 .2 .1 .2 .2 .1 .2 .1 .1 .1 .0 .1 .1 .1 .1 .1 .0 .0 .0 .1 .1 .2 .3 .4 .3 .1 .1 .1 .0 .1 .1 .1 .2 .1
.2 .2 .2 .2 .2 .2 .2 .1 .3 .2 .2 .1 .1 .2 .1 .2 .2 .2 .1 .1 .2 .2 .2 .2 .2 .2 .1 .0 .0 .1 .0 .1 .0 .1 .2 .1
.3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .3 .3 .3 .1 .1 .2 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .2 .1 .1 .2 .2
.4 .4 .3 .4 .4 .4 .4 .4 .5 .5 .4 .3 .4 .3 .4 .4 .3 .2 .1 .2 .2 .2 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .4 .4 .3 .3 .3 .2 .2 .2 .2 .2 .2 .3 .4 .4 .3 .3 .3 .3 .2 .3 .3 .4 .4 .3 .3
.3 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .2 .2 .1 .1 .2 .1 .0 .1 .1 .1 .1 .2 .2 .1 .1 .0 .0 .0 .0 .0 .1 .2 .2 .1 .2
-.1 .0 .0 .0 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.4 -.4 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.4 -.4 -.3 -.3 -.3 -.3 -.2
-.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.5 -.6 -.6 -.6 -.6 -.5 -.5 -.5 -.5 -.4 -.4 -.5 -.6 -.6
-.6 -.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.6 -.5 -.5 -.6 -.5 -.5 -.4 -.4 -.5 -.5 -.5 -.5

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

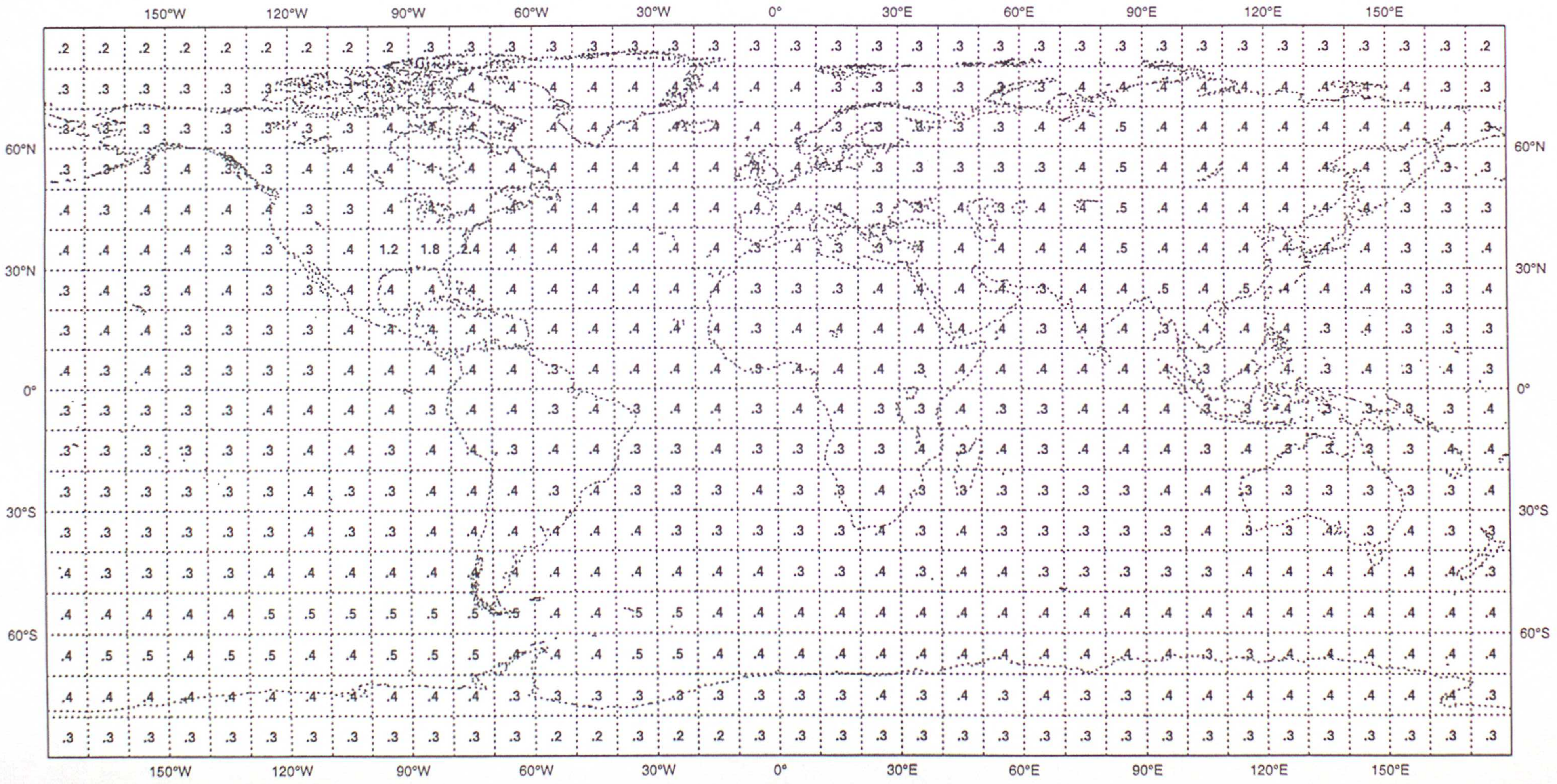
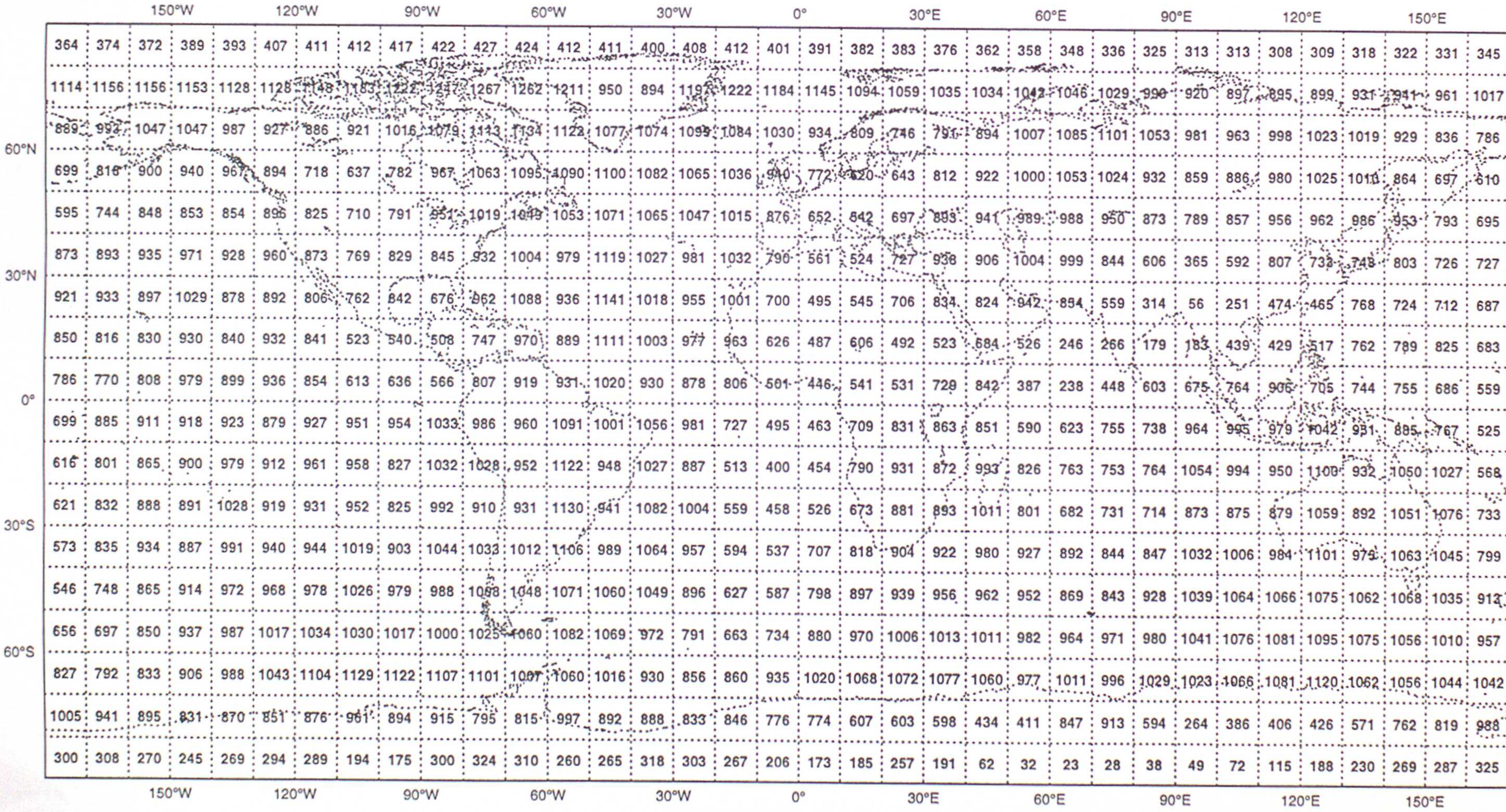
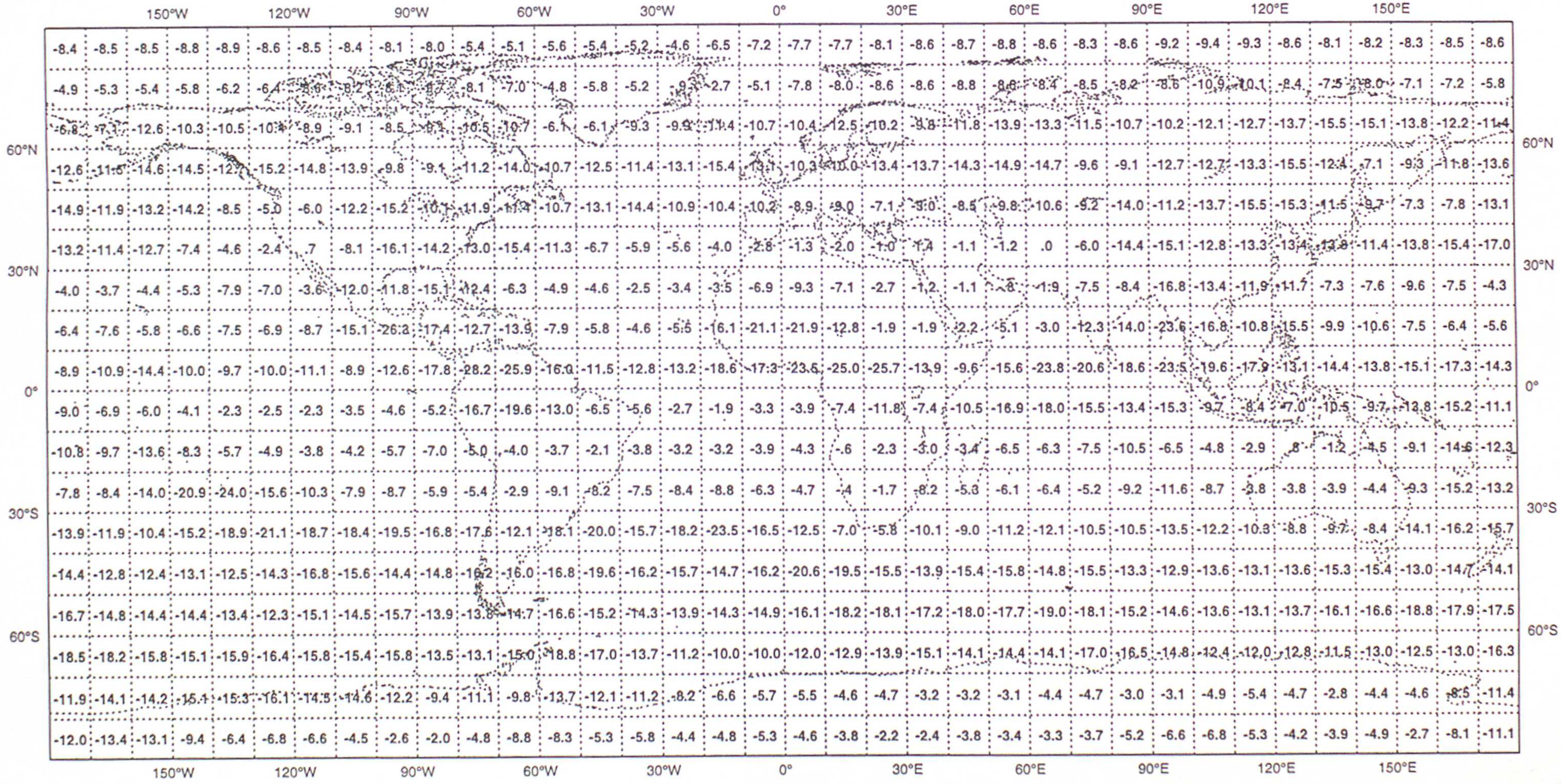

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3
.4 .3 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3
.4 .4 .4 .4 .3 .3 .3 .4 1.2 1.8 2.4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .4
.3 .4 .3 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .3 .4 .4 .5 .4 .5 .4 .4 .4 .3 .3 .4
.3 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .3 .4 .3 .3 .3
.4 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .3 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .3 .4 .3
.3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .4 .4 .3 .4 .3 .4 .4 .3 .4 .4 .3 .3 .4 .3 .3 .4 .4 .4 .3 .3 .4 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .4 .3 .4 .4 .3 .3 .4 .3 .3 .3 .3 .4 .3 .4 .3 .4 .4 .4 .3 .4 .3 .3 .3 .3 .4 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .3 .4 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .4 .3 .3
.4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3
.4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .5 .5 .4 .5 .5 .4 .4 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3

Figure 55. ATOVS mean daily count. JUNE 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 522667



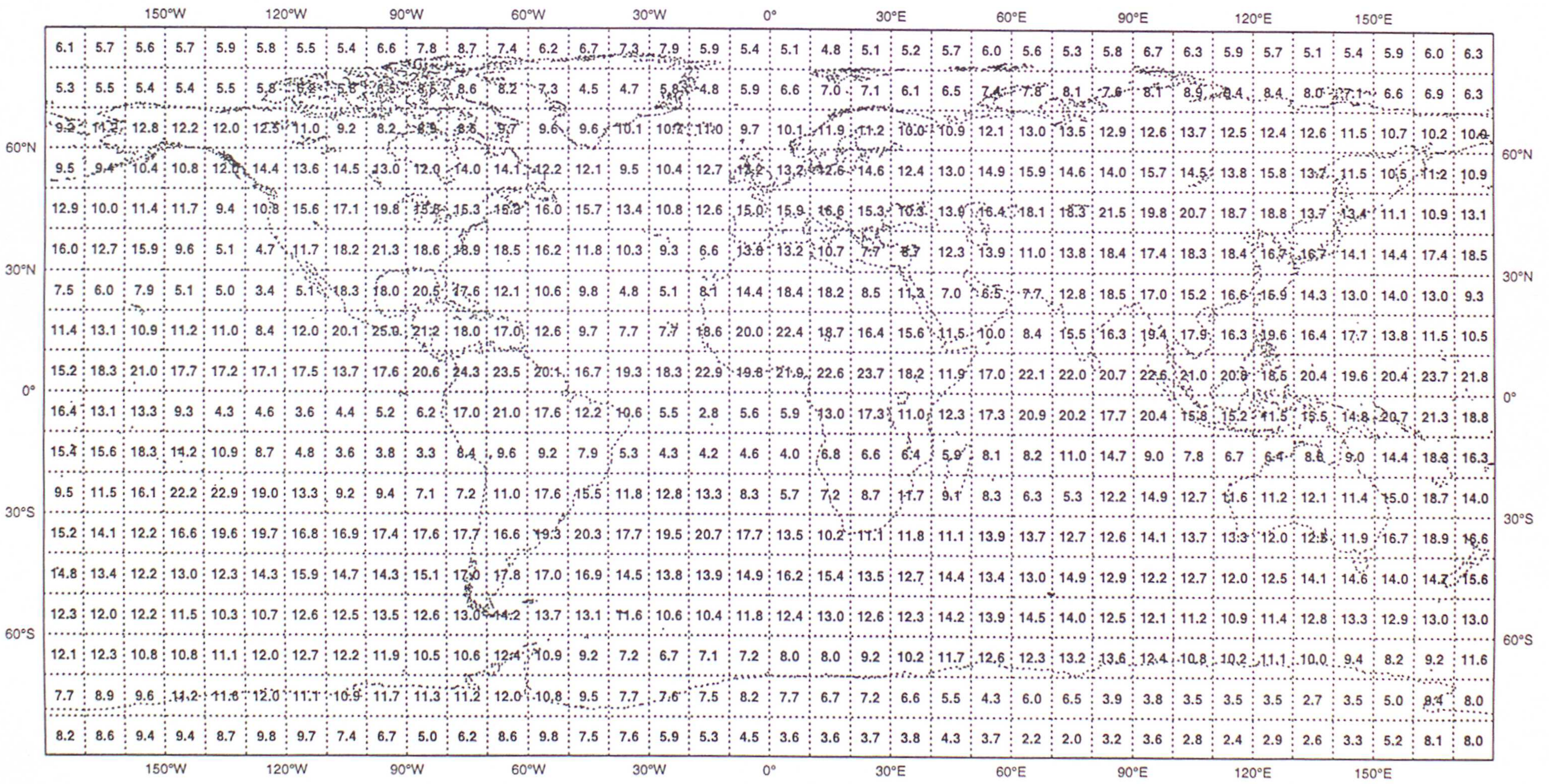
364	374	372	389	393	407	411	412	417	422	427	424	412	411	400	408	412	401	391	382	383	376	362	358	348	336	325	313	313	308	309	318	322	331	345	358
1114	1156	1156	1153	1128	1128	1148	1183	1222	1247	1267	1262	1211	950	894	1197	1222	1184	1145	1094	1059	1035	1034	1042	1046	1029	990	920	897	895	899	931	941	961	1017	1044
889	992	1047	1047	987	927	886	921	1016	1079	1113	1134	1122	1077	1074	1099	1084	1030	934	809	746	791	894	1007	1085	1101	1053	981	963	998	1023	1019	929	836	786	804
699	816	900	940	967	894	718	637	782	967	1063	1095	1090	1100	1082	1065	1036	940	772	620	643	812	922	1000	1053	1024	932	859	886	980	1025	1010	864	697	610	616
595	744	848	853	854	896	825	710	791	951	1019	1049	1053	1071	1065	1047	1015	876	652	642	697	893	941	989	988	950	873	789	857	956	962	986	953	793	695	621
873	893	935	971	928	960	873	769	829	845	932	1004	979	1119	1027	981	1032	790	561	524	727	938	906	1004	999	844	606	365	592	807	733	748	803	726	727	767
921	933	897	1029	878	892	806	762	842	676	962	1088	936	1141	1018	955	1001	700	495	545	706	834	824	942	854	559	314	56	251	474	465	768	724	712	687	690
850	816	830	930	840	932	841	523	540	508	747	970	889	1111	1003	977	963	626	487	606	492	523	684	526	246	266	179	183	439	429	517	762	789	825	683	594
786	770	808	979	899	936	854	613	636	566	807	919	931	1020	930	878	806	501	446	541	531	729	842	387	238	448	603	675	764	906	705	744	755	686	559	515
699	885	911	918	923	879	927	951	954	1033	986	960	1091	1001	1056	981	727	495	463	709	831	863	851	590	623	755	738	964	995	979	1042	931	885	767	525	418
616	801	865	900	979	912	961	958	827	1032	1028	952	1122	948	1027	887	513	400	454	790	931	872	993	826	763	753	764	1054	994	950	1100	932	1050	1027	568	416
621	832	888	891	1028	919	931	952	825	992	910	931	1130	941	1082	1004	559	458	526	673	881	893	1011	801	682	731	714	873	875	879	1059	892	1051	1076	733	559
573	835	934	887	991	940	944	1019	903	1044	1033	1012	1106	989	1064	957	594	537	707	818	904	922	980	927	892	844	847	1032	1006	984	1101	975	1063	1045	799	593
546	748	865	914	972	968	978	1026	979	988	1068	1048	1071	1060	1049	896	627	587	798	897	939	956	962	952	869	843	928	1039	1064	1066	1075	1062	1068	1035	913	676
656	697	850	937	987	1017	1034	1030	1017	1000	1025	1060	1082	1069	972	791	663	734	880	970	1006	1013	1011	982	964	971	980	1041	1076	1081	1095	1075	1056	1010	957	813
827	792	833	906	988	1043	1104	1129	1122	1107	1101	1007	1060	1016	930	856	860	935	1020	1068	1072	1077	1060	977	1011	996	1029	1023	1066	1081	1120	1062	1056	1044	1042	953
1005	941	895	831	870	851	876	961	894	915	795	815	997	892	888	833	846	776	774	607	603	598	434	411	847	913	594	264	386	406	426	571	762	819	988	1002
300	308	270	245	269	294	289	194	175	300	324	310	260	265	318	303	267	206	173	185	257	191	62	32	23	28	38	49	72	115	188	230	269	287	325	289

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



-8.4	-8.5	-8.5	-8.8	-8.9	-8.6	-8.5	-8.4	-8.1	-8.0	-5.4	-5.1	-5.6	-5.4	-5.2	-4.6	-6.5	-7.2	-7.7	-7.7	-8.1	-8.6	-8.7	-8.8	-8.6	-8.3	-8.6	-9.2	-9.4	-9.3	-8.6	-8.1	-8.2	-8.3	-8.5	-8.6
-4.9	-5.3	-5.4	-5.8	-6.2	-6.4	-8.6	-8.2	-8.1	-8.7	-8.1	-7.0	-4.8	-5.8	-5.2	-9.3	-2.7	-5.1	-7.8	-8.0	-8.6	-8.6	-8.8	-8.6	-8.4	-8.5	-8.2	-8.6	-10.9	-10.1	-8.4	-7.5	-8.0	-7.1	-7.2	-5.8
-6.8	-7.1	-12.6	-10.3	-10.5	-10.4	-8.9	-9.1	-8.5	-9.1	-10.5	-10.7	-6.1	-6.1	-9.3	-9.9	-11.4	-10.7	-10.4	-12.5	-10.2	-9.8	-11.8	-13.9	-13.3	-11.5	-10.7	-10.2	-12.1	-12.7	-13.7	-15.5	-15.1	-13.8	-12.2	-11.4
-12.6	-11.5	-14.6	-14.5	-12.7	-15.2	-14.8	-13.9	-9.8	-9.1	-11.2	-14.0	-10.7	-12.5	-11.4	-13.1	-15.4	-13.1	-10.3	-10.0	-13.4	-13.7	-14.3	-14.9	-14.7	-9.6	-9.1	-12.7	-12.7	-13.3	-15.5	-12.4	-7.1	-9.3	-11.8	-13.6
-14.9	-11.9	-13.2	-14.2	-8.5	-5.0	-6.0	-12.2	-15.2	-10.1	-11.9	-11.4	-10.7	-13.1	-14.4	-10.9	-10.4	-10.2	-8.9	-9.0	-7.1	-9.0	-8.5	-9.8	-10.6	-9.2	-14.0	-11.2	-13.7	-15.5	-15.3	-11.5	-9.7	-7.3	-7.8	-13.1
-13.2	-11.4	-12.7	-7.4	-4.6	-2.4	.7	-8.1	-16.1	-14.2	-13.0	-15.4	-11.3	-6.7	-5.9	-5.6	-4.0	-2.8	-1.3	-2.0	-1.0	-1.4	-1.1	-1.2	.0	-6.0	-14.4	-15.1	-12.8	-13.3	-13.4	-13.8	-11.4	-13.8	-15.4	-17.0
-4.0	-3.7	-4.4	-5.3	-7.9	-7.0	-3.6	-12.0	-11.8	-15.1	-12.4	-6.3	-4.9	-4.6	-2.5	-3.4	-3.5	-6.9	-9.3	-7.1	-2.7	-1.2	-1.1	-.8	-1.9	-7.5	-8.4	-16.8	-13.4	-11.9	-11.7	-7.3	-7.6	-9.6	-7.5	-4.3
-6.4	-7.6	-5.8	-6.6	-7.5	-6.9	-8.7	-15.1	-26.3	-17.4	-12.7	-13.9	-7.9	-5.8	-4.6	-5.5	-16.1	-21.1	-21.9	-12.8	-1.9	-1.9	-2.2	-5.1	-3.0	-12.3	-14.0	-23.6	-16.8	-10.8	-15.5	-9.9	-10.6	-7.5	-6.4	-5.6
-8.9	-10.9	-14.4	-10.0	-9.7	-10.0	-11.1	-8.9	-12.6	-17.8	-28.2	-25.9	-16.0	-11.5	-12.8	-13.2	-18.6	-17.3	-23.5	-25.0	-25.7	-13.9	-9.6	-15.6	-23.8	-20.6	-18.6	-23.5	-19.6	-17.9	-13.1	-14.4	-13.8	-15.1	-17.3	-14.3
-9.0	-6.9	-6.0	-4.1	-2.3	-2.5	-2.3	-3.5	-4.6	-5.2	-16.7	-19.6	-13.0	-6.5	-5.6	-2.7	-1.9	-3.3	-3.9	-7.4	-11.8	-7.4	-10.5	-16.9	-18.0	-15.5	-13.4	-15.3	-9.7	-8.4	-7.0	-10.5	-9.7	-13.8	-15.2	-11.1
-10.8	-9.7	-13.6	-8.3	-5.7	-4.9	-3.8	-4.2	-5.7	-7.0	-5.0	-4.0	-3.7	-2.1	-3.8	-3.2	-3.2	-3.9	-4.3	-.6	-2.3	-3.0	-3.4	-6.5	-6.3	-7.5	-10.5	-6.5	-4.8	-2.9	.8	-1.2	-4.5	-9.1	-14.6	-12.3
-7.8	-8.4	-14.0	-20.9	-24.0	-15.6	-10.3	-7.9	-8.7	-5.9	-5.4	-2.9	-9.1	-8.2	-7.5	-8.4	-8.8	-6.3	-4.7	-.4	-1.7	-8.2	-5.3	-6.1	-6.4	-5.2	-9.2	-11.6	-8.7	-3.8	-3.8	-3.9	-4.4	-9.3	-15.2	-13.2
-13.9	-11.9	-10.4	-15.2	-18.9	-21.1	-18.7	-18.4	-19.5	-16.8	-17.6	-12.1	-18.1	-20.0	-15.7	-18.2	-23.5	-16.5	-12.5	-7.0	-5.8	-10.1	-9.0	-11.2	-12.1	-10.5	-10.5	-13.5	-12.2	-10.3	-8.8	-9.7	-8.4	-14.1	-16.2	-15.7
-14.4	-12.8	-12.4	-13.1	-12.5	-14.3	-16.8	-15.6	-14.4	-14.8	-16.2	-16.0	-16.8	-19.6	-16.2	-15.7	-14.7	-16.2	-20.6	-19.5	-15.5	-13.9	-15.4	-15.8	-14.8	-15.5	-13.3	-12.9	-13.6	-13.1	-13.6	-15.3	-15.4	-13.0	-14.7	-14.1
-16.7	-14.8	-14.4	-14.4	-13.4	-12.3	-15.1	-14.5	-15.7	-13.9	-13.8	-14.7	-16.6	-15.2	-14.3	-13.9	-14.3	-14.9	-16.1	-18.2	-18.1	-17.2	-18.0	-17.7	-19.0	-18.1	-15.2	-14.6	-13.6	-13.1	-13.7	-16.1	-16.6	-18.8	-17.9	-17.5
-18.5	-18.2	-15.8	-15.1	-15.9	-16.4	-15.8	-15.4	-15.8	-13.5	-13.1	-15.0	-18.8	-17.0	-13.7	-11.2	-10.0	-10.0	-12.0	-12.9	-13.9	-15.1	-14.1	-14.4	-14.1	-17.0	-16.5	-14.8	-12.4	-12.0	-12.8	-11.5	-13.0	-12.5	-13.0	-16.3
-11.9	-14.1	-14.2	-15.1	-15.3	-16.1	-14.5	-14.6	-12.2	-9.4	-11.1	-9.8	-13.7	-12.1	-11.2	-8.2	-6.6	-5.7	-5.5	-4.6	-4.7	-3.2	-3.2	-3.1	-4.4	-4.7	-3.0	-3.1	-4.9	-5.4	-4.7	-2.8	-4.4	-4.6	-8.5	-11.4
-12.0	-13.4	-13.1	-9.4	-6.4	-6.8	-6.6	-4.5	-2.6	-2.0	-4.8	-8.8	-8.3	-5.3	-5.8	-4.4	-4.8	-5.3	-4.6	-3.8	-2.2	-2.4	-3.8	-3.4	-3.3	-3.7	-5.2	-6.6	-6.8	-5.3	-4.2	-3.9	-4.9	-2.7	-8.1	-11.1

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



6.1	5.7	5.6	5.7	5.9	5.8	5.5	5.4	6.6	7.8	8.7	7.4	6.2	6.7	7.3	7.9	5.9	5.4	5.1	4.8	5.1	5.2	5.7	6.0	5.6	5.3	5.8	6.7	6.3	5.9	5.7	5.1	5.4	5.9	6.0	6.3
5.3	5.5	5.4	5.4	5.5	5.8	6.2	5.8	8.5	8.5	8.6	8.2	7.3	4.5	4.7	5.8	4.8	5.9	6.6	7.0	7.1	6.1	6.5	7.4	7.8	8.1	7.6	8.1	8.9	8.4	8.4	8.0	7.1	6.6	6.9	6.3
9.2	11.2	12.8	12.2	12.0	12.5	11.0	9.2	8.2	8.9	8.6	9.7	9.6	9.6	10.1	10.2	11.0	9.7	10.1	11.9	11.2	10.0	10.9	12.1	13.0	13.5	12.9	12.6	13.7	12.5	12.4	12.6	11.5	10.7	10.2	10.6
9.5	9.4	10.4	10.8	12.0	14.4	13.6	14.5	13.0	12.0	14.0	14.1	12.2	12.1	9.5	10.4	12.7	13.2	13.2	12.6	14.6	12.4	13.0	14.9	15.9	14.6	14.0	15.7	14.5	13.8	15.8	13.7	11.5	10.5	11.2	10.9
12.9	10.0	11.4	11.7	9.4	10.8	15.6	17.1	19.8	15.5	15.3	15.8	16.0	15.7	13.4	10.8	12.6	15.0	15.9	16.6	15.3	10.3	13.9	16.4	18.1	18.3	21.5	19.8	20.7	18.7	18.8	13.7	13.4	11.1	10.9	13.1
16.0	12.7	15.9	9.6	5.1	4.7	11.7	18.2	21.3	18.6	18.9	18.5	16.2	11.8	10.3	9.3	6.6	13.8	13.2	10.7	7.7	8.7	12.3	13.9	11.0	13.8	18.4	17.4	18.3	18.4	16.7	16.7	14.1	14.4	17.4	18.5
7.5	6.0	7.9	5.1	5.0	3.4	5.1	18.3	18.0	20.5	17.6	12.1	10.6	9.8	4.8	5.1	8.1	14.4	18.4	18.2	8.5	11.3	7.0	6.5	7.7	12.8	18.5	17.0	15.2	16.6	16.9	14.3	13.0	14.0	13.0	9.3
11.4	13.1	10.9	11.2	11.0	8.4	12.0	20.1	25.0	21.2	18.0	17.0	12.6	9.7	7.7	7.7	18.6	20.0	22.4	18.7	16.4	15.6	11.5	10.0	8.4	15.5	16.3	19.4	17.9	16.3	19.6	16.4	17.7	13.8	11.5	10.5
15.2	18.3	21.0	17.7	17.2	17.1	17.5	13.7	17.6	20.6	24.3	23.5	20.1	16.7	19.3	18.3	22.9	19.8	21.9	22.6	23.7	18.2	11.9	17.0	22.1	22.0	20.7	22.6	21.0	20.8	18.5	20.4	19.6	20.4	23.7	21.8
16.4	13.1	13.3	9.3	4.3	4.6	3.6	4.4	5.2	6.2	17.0	21.0	17.6	12.2	10.6	5.5	2.8	5.6	5.9	13.0	17.3	11.0	12.3	17.3	20.9	20.2	17.7	20.4	15.8	15.2	11.5	15.5	14.8	20.7	21.3	18.8
15.4	15.6	18.3	14.2	10.9	8.7	4.8	3.6	3.8	3.3	8.4	9.6	9.2	7.9	5.3	4.3	4.2	4.6	4.0	6.8	6.6	6.4	5.9	8.1	8.2	11.0	14.7	9.0	7.8	6.7	6.4	8.8	9.0	14.4	18.8	16.3
9.5	11.5	16.1	22.2	22.9	19.0	13.3	9.2	9.4	7.1	7.2	11.0	17.6	15.5	11.8	12.8	13.3	8.3	5.7	7.2	8.7	11.7	9.1	8.3	6.3	5.3	12.2	14.9	12.7	11.6	11.2	12.1	11.4	15.0	18.7	14.0
15.2	14.1	12.2	16.6	19.6	19.7	16.8	16.9	17.4	17.6	17.7	16.6	19.3	20.3	17.7	19.5	20.7	17.7	13.5	10.2	11.1	11.8	11.1	13.9	13.7	12.7	12.6	14.1	13.7	13.3	12.0	12.5	11.9	16.7	18.9	16.6
14.8	13.4	12.2	13.0	12.3	14.3	15.9	14.7	14.3	15.1	17.0	17.8	17.0	16.9	14.5	13.8	13.9	14.9	16.2	15.4	13.5	12.7	14.4	13.4	13.0	14.9	12.9	12.2	12.7	12.0	12.5	14.1	14.6	14.0	14.7	15.6
12.3	12.0	12.2	11.5	10.3	10.7	12.6	12.5	13.5	12.6	13.0	14.2	13.7	13.1	11.6	10.6	10.4	11.8	12.4	13.0	12.6	12.3	14.2	13.9	14.5	14.0	12.5	12.1	11.2	10.9	11.4	12.8	13.3	12.9	13.0	13.0
12.1	12.3	10.8	10.8	11.1	12.0	12.7	12.2	11.9	10.5	10.6	12.4	10.9	9.2	7.2	6.7	7.1	7.2	8.0	8.0	9.2	10.2	11.7	12.6	12.3	13.2	13.6	12.4	10.8	10.2	11.1	10.0	9.4	8.2	9.2	11.6
7.7	8.9	9.6	14.2	11.6	12.0	11.1	10.9	11.7	11.3	11.2	12.0	10.8	9.5	7.7	7.6	7.5	8.2	7.7	6.7	7.2	6.6	5.5	4.3	6.0	6.5	3.9	3.8	3.5	3.5	3.5	2.7	3.5	5.0	8.4	8.0
8.2	8.6	9.4	9.4	8.7	9.8	9.7	7.4	6.7	5.0	6.2	8.6	9.8	7.5	7.6	5.9	5.3	4.5	3.6	3.6	3.7	3.8	4.3	3.7	2.2	2.0	3.2	3.6	2.8	2.4	2.9	2.6	3.3	5.2	8.1	8.0

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations

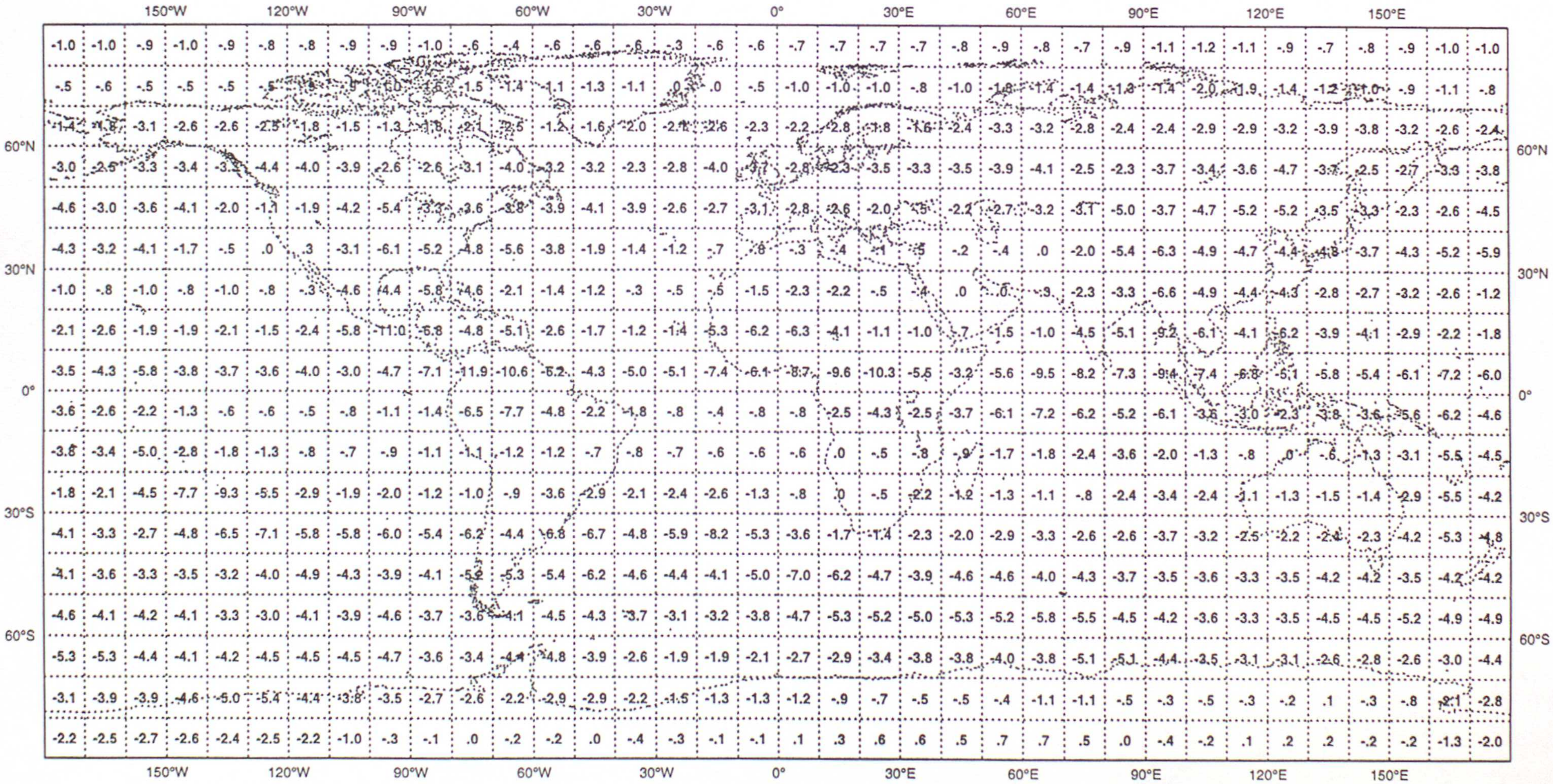
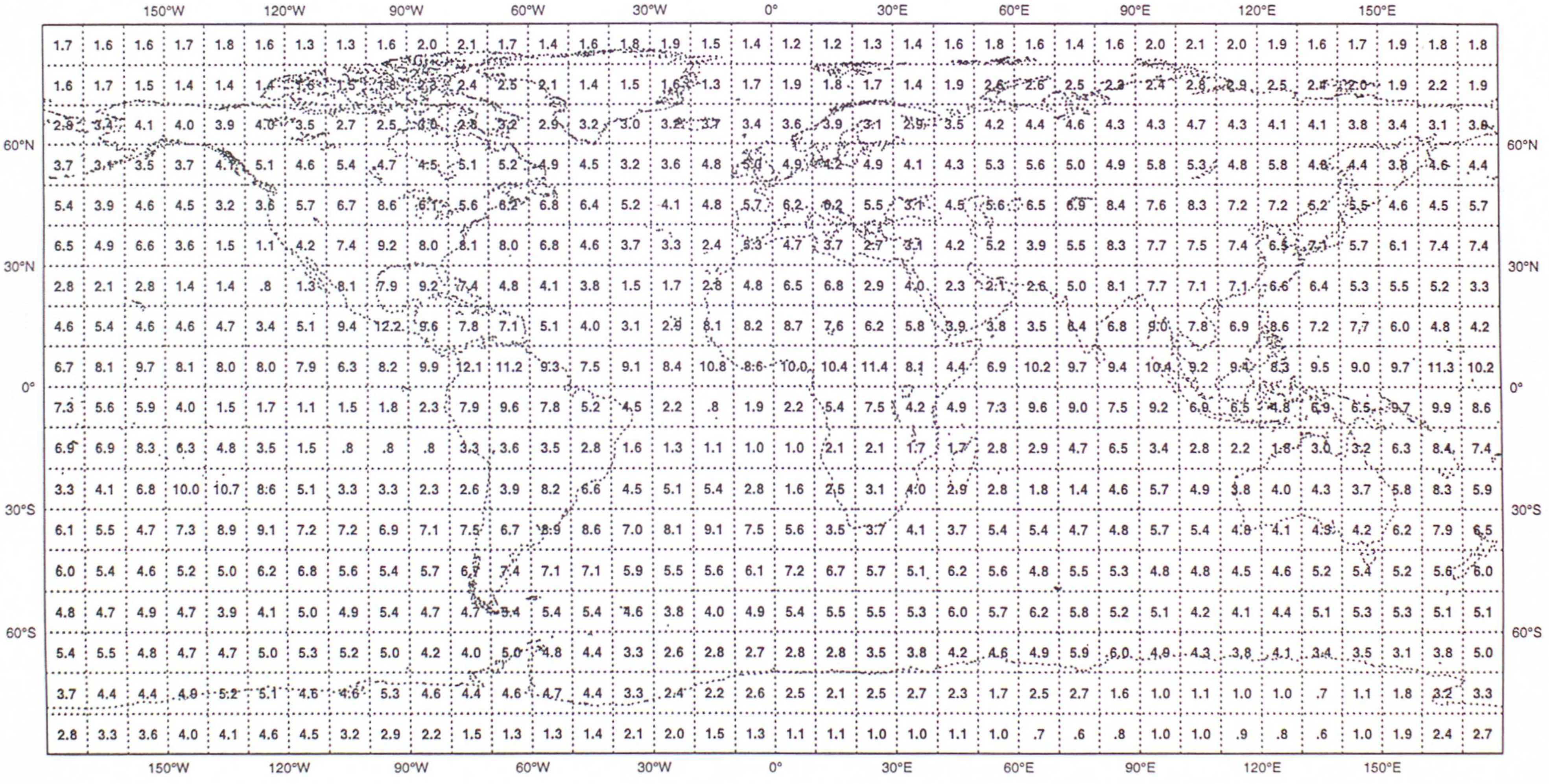
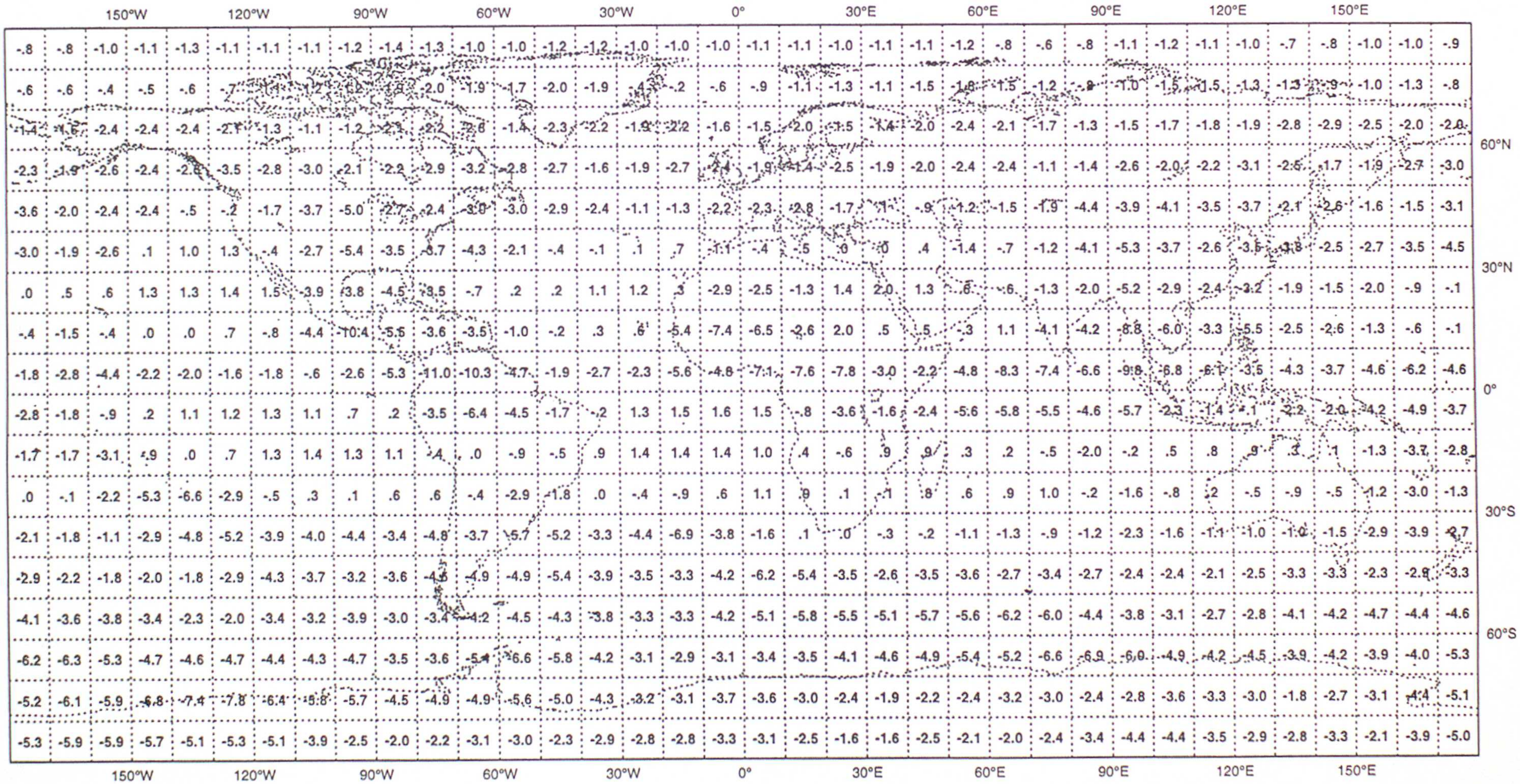

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-1.0 -1.0 -.9 -1.0 -.9 -.8 -.8 -.9 -.9 -1.0 -.6 -.4 -.6 -.6 -.6 -.3 -.6 -.6 -.7 -.7 -.7 -.7 -.8 -.9 -.8 -.7 -.9 -1.1 -1.2 -1.1 -.9 -.7 -.8 -.9 -1.0 -1.0
-.5 -.6 -.5 -.5 -.5 -.5 -.8 -.9 -1.0 -1.6 -1.5 -1.4 -1.1 -1.3 -1.1 .0 .0 -.5 -1.0 -1.0 -1.0 -.8 -1.0 -1.8 -1.4 -1.4 -1.8 -1.4 -2.0 -1.9 -1.4 -1.2 -1.0 -.9 -1.1 -.8
-1.4 -1.8 -3.1 -2.6 -2.6 -2.5 -1.8 -1.5 -1.3 -1.8 -2.1 -2.5 -1.2 -1.6 -2.0 -2.1 -2.6 -2.3 -2.2 -2.8 -1.8 -1.6 -2.4 -3.3 -3.2 -2.8 -2.4 -2.4 -2.9 -2.9 -3.2 -3.9 -3.8 -3.2 -2.6 -2.4
-3.0 -2.5 -3.3 -3.4 -3.3 -4.4 -4.0 -3.9 -2.6 -2.6 -3.1 -4.0 -3.2 -3.2 -2.3 -2.8 -4.0 -3.7 -2.8 -2.3 -3.5 -3.3 -3.5 -3.9 -4.1 -2.5 -2.3 -3.7 -3.4 -3.6 -4.7 -3.7 -2.5 -2.7 -3.3 -3.8
-4.6 -3.0 -3.6 -4.1 -2.0 -1.1 -1.9 -4.2 -5.4 -3.3 -3.6 -3.8 -3.9 -4.1 -3.9 -2.6 -2.7 -3.1 -2.8 -2.6 -2.0 -.5 -2.2 -2.7 -3.2 -3.1 -5.0 -3.7 -4.7 -5.2 -5.2 -3.5 -3.3 -2.3 -2.6 -4.5
-4.3 -3.2 -4.1 -1.7 -.5 .0 .3 -3.1 -6.1 -5.2 -4.8 -5.6 -3.8 -1.9 -1.4 -1.2 -.7 -.8 -.3 -.4 -.1 -.5 -.2 -.4 .0 -2.0 -5.4 -6.3 -4.9 -4.7 -4.4 -4.8 -3.7 -4.3 -5.2 -5.9
-1.0 -.8 -1.0 -.8 -1.0 -.8 -.3 -4.6 -4.4 -5.8 -4.6 -2.1 -1.4 -1.2 -.3 -.5 -.5 -1.5 -2.3 -2.2 -.5 -.4 .0 .0 -.3 -2.3 -3.3 -6.6 -4.9 -4.4 -4.3 -2.8 -2.7 -3.2 -2.6 -1.2
-2.1 -2.6 -1.9 -1.9 -2.1 -1.5 -2.4 -5.8 -11.0 -6.8 -4.8 -5.1 -2.6 -1.7 -1.2 -1.4 -5.3 -6.2 -6.3 -4.1 -1.1 -1.0 -.7 -1.5 -1.0 -4.5 -5.1 -9.2 -6.1 -4.1 -6.2 -3.9 -4.1 -2.9 -2.2 -1.8
-3.5 -4.3 -5.8 -3.8 -3.7 -3.6 -4.0 -3.0 -4.7 -7.1 -11.9 -10.6 -6.2 -4.3 -5.0 -5.1 -7.4 -6.1 -8.7 -9.6 -10.3 -5.5 -3.2 -5.6 -9.5 -8.2 -7.3 -9.4 -7.4 -6.8 -5.1 -5.8 -5.4 -6.1 -7.2 -6.0
-3.6 -2.6 -2.2 -1.3 -.6 -.6 -.5 -.8 -1.1 -1.4 -6.5 -7.7 -4.8 -2.2 -1.8 -.8 -.4 -.8 -.8 -2.5 -4.3 -2.5 -3.7 -6.1 -7.2 -6.2 -5.2 -6.1 -3.6 -3.0 -2.3 -3.8 -3.6 -5.6 -6.2 -4.6
-3.8 -3.4 -5.0 -2.8 -1.8 -1.3 -.8 -.7 -.9 -1.1 -1.1 -1.2 -1.2 -.7 -.8 -.7 -.6 -.6 -.6 .0 -.5 -.8 -.9 -1.7 -1.8 -2.4 -3.6 -2.0 -1.3 -.8 .0 -.6 -1.3 -3.1 -5.5 -4.5
-1.8 -2.1 -4.5 -7.7 -9.3 -5.5 -2.9 -1.9 -2.0 -1.2 -1.0 -.9 -3.6 -2.9 -2.1 -2.4 -2.6 -1.3 -.8 .0 -.5 -2.2 -1.2 -1.3 -1.1 -.8 -2.4 -3.4 -2.4 -1.1 -1.3 -1.5 -1.4 -2.9 -5.5 -4.2
-4.1 -3.3 -2.7 -4.8 -6.5 -7.1 -5.8 -5.8 -6.0 -5.4 -6.2 -4.4 -6.8 -6.7 -4.8 -5.9 -8.2 -5.3 -3.6 -1.7 -1.4 -2.3 -2.0 -2.9 -3.3 -2.6 -2.6 -3.7 -3.2 -2.5 -2.2 -2.4 -2.3 -4.2 -5.3 -4.8
-4.1 -3.6 -3.3 -3.5 -3.2 -4.0 -4.9 -4.3 -3.9 -4.1 -5.2 -5.3 -5.4 -6.2 -4.6 -4.4 -4.1 -5.0 -7.0 -6.2 -4.7 -3.9 -4.6 -4.6 -4.0 -4.3 -3.7 -3.5 -3.6 -3.3 -3.5 -4.2 -4.2 -3.5 -4.2 -4.2
-4.6 -4.1 -4.2 -4.1 -3.3 -3.0 -4.1 -3.9 -4.6 -3.7 -3.6 -4.1 -4.5 -4.3 -3.7 -3.1 -3.2 -3.8 -4.7 -5.3 -5.2 -5.0 -5.3 -5.2 -5.8 -5.5 -4.5 -4.2 -3.6 -3.3 -3.5 -4.5 -4.5 -5.2 -4.9 -4.9
-5.3 -5.3 -4.4 -4.1 -4.2 -4.5 -4.5 -4.5 -4.7 -3.6 -3.4 -4.4 -4.8 -3.9 -2.6 -1.9 -1.9 -2.1 -2.7 -2.9 -3.4 -3.8 -3.8 -4.0 -3.8 -5.1 -5.1 -4.4 -3.5 -3.1 -3.1 -2.6 -2.8 -2.6 -3.0 -4.4
-3.1 -3.9 -3.9 -4.6 -5.0 -5.4 -4.4 -3.8 -3.5 -2.7 -2.6 -2.2 -2.9 -2.9 -2.2 -1.5 -1.3 -1.3 -1.2 -.9 -.7 -.5 -.5 -.4 -1.1 -1.1 -.5 -.3 -.5 -.3 -.2 .1 -.3 -.8 -2.1 -2.8
-2.2 -2.5 -2.7 -2.6 -2.4 -2.5 -2.2 -1.0 -.3 -.1 .0 -.2 -.2 .0 -.4 -.3 -.1 -.1 .1 .3 .6 .6 .5 .7 .7 .5 .0 -.4 -.2 .1 .2 .2 -.2 -.2 -1.3 -2.0

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



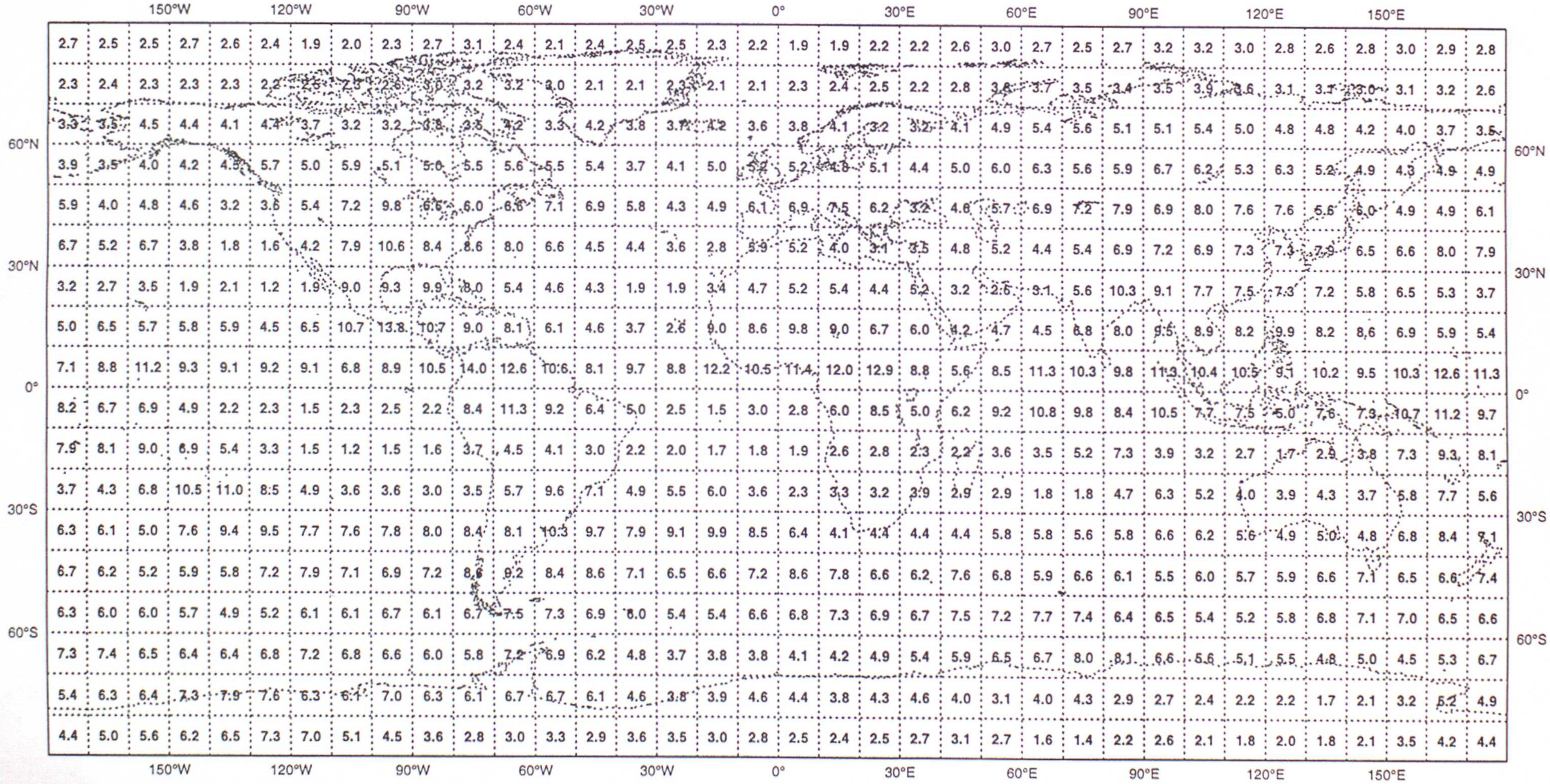
1.7	1.6	1.6	1.7	1.8	1.6	1.3	1.3	1.6	2.0	2.1	1.7	1.4	1.6	1.8	1.9	1.5	1.4	1.2	1.2	1.3	1.4	1.6	1.8	1.6	1.4	1.6	2.0	2.1	2.0	1.9	1.6	1.7	1.9	1.8	1.8
1.6	1.7	1.5	1.4	1.4	1.4	1.6	1.5	1.8	2.3	2.4	2.5	2.1	1.4	1.5	1.6	1.3	1.7	1.9	1.8	1.7	1.4	1.9	2.6	2.6	2.5	2.3	2.4	2.8	2.9	2.5	2.4	2.0	1.9	2.2	1.9
2.8	3.4	4.1	4.0	3.9	4.0	3.5	2.7	2.5	3.0	2.8	3.2	2.9	3.2	3.0	3.2	3.7	3.4	3.6	3.9	3.1	2.9	3.5	4.2	4.4	4.6	4.3	4.3	4.7	4.3	4.1	4.1	3.8	3.4	3.1	3.8
3.7	3.1	3.5	3.7	4.7	5.1	4.6	5.4	4.7	4.5	5.1	5.2	4.9	4.5	3.2	3.6	4.8	5.0	4.9	4.2	4.9	4.1	4.3	5.3	5.6	5.0	4.9	5.8	5.3	4.8	5.8	4.8	4.4	3.8	4.6	4.4
5.4	3.9	4.6	4.5	3.2	3.6	5.7	6.7	8.6	6.1	5.6	6.2	6.8	6.4	5.2	4.1	4.8	5.7	6.2	6.2	5.5	3.1	4.5	5.6	6.5	6.9	8.4	7.6	8.3	7.2	7.2	6.2	5.5	4.6	4.5	5.7
6.5	4.9	6.6	3.6	1.5	1.1	4.2	7.4	9.2	8.0	8.1	8.0	6.8	4.6	3.7	3.3	2.4	3.3	4.7	3.7	2.7	3.1	4.2	5.2	3.9	5.5	8.3	7.7	7.5	7.4	6.5	7.1	5.7	6.1	7.4	7.4
2.8	2.1	2.8	1.4	1.4	.8	1.3	8.1	7.9	9.2	7.4	4.8	4.1	3.8	1.5	1.7	2.8	4.8	6.5	6.8	2.9	4.0	2.3	2.1	2.6	5.0	8.1	7.7	7.1	7.1	6.6	6.4	5.3	5.5	5.2	3.3
4.6	5.4	4.6	4.6	4.7	3.4	5.1	9.4	12.2	9.6	7.8	7.1	5.1	4.0	3.1	2.9	8.1	8.2	8.7	7.6	6.2	5.8	3.9	3.8	3.5	6.4	6.8	9.0	7.8	6.9	8.6	7.2	7.7	6.0	4.8	4.2
6.7	8.1	9.7	8.1	8.0	8.0	7.9	6.3	8.2	9.9	12.1	11.2	9.3	7.5	9.1	8.4	10.8	8.6	10.0	10.4	11.4	8.1	4.4	6.9	10.2	9.7	9.4	10.4	9.2	9.4	8.3	9.5	9.0	9.7	11.3	10.2
7.3	5.6	5.9	4.0	1.5	1.7	1.1	1.5	1.8	2.3	7.9	9.6	7.8	5.2	4.5	2.2	.8	1.9	2.2	5.4	7.5	4.2	4.9	7.3	9.6	9.0	7.5	9.2	6.9	6.5	4.8	6.9	6.5	9.7	9.9	8.6
6.9	6.9	8.3	6.3	4.8	3.5	1.5	.8	.8	.8	3.3	3.6	3.5	2.8	1.6	1.3	1.1	1.0	1.0	2.1	2.1	1.7	1.7	2.8	2.9	4.7	6.5	3.4	2.8	2.2	1.8	3.0	3.2	6.3	8.4	7.4
3.3	4.1	6.8	10.0	10.7	8.6	5.1	3.3	3.3	2.3	2.6	3.9	8.2	6.6	4.5	5.1	5.4	2.8	1.6	2.5	3.1	4.0	2.9	2.8	1.8	1.4	4.6	5.7	4.9	3.8	4.0	4.3	3.7	5.8	8.3	5.9
6.1	5.5	4.7	7.3	8.9	9.1	7.2	7.2	6.9	7.1	7.5	6.7	8.9	8.6	7.0	8.1	9.1	7.5	5.6	3.5	3.7	4.1	3.7	5.4	5.4	4.7	4.8	5.7	5.4	4.8	4.1	4.3	4.2	6.2	7.9	6.5
6.0	5.4	4.6	5.2	5.0	6.2	6.8	5.6	5.4	5.7	6.7	7.4	7.1	7.1	5.9	5.5	5.6	6.1	7.2	6.7	5.7	5.1	6.2	5.6	4.8	5.5	5.3	4.8	4.8	4.5	4.6	5.2	5.4	5.2	5.6	6.0
4.8	4.7	4.9	4.7	3.9	4.1	5.0	4.9	5.4	4.7	4.7	5.4	5.4	5.4	4.6	3.8	4.0	4.9	5.4	5.5	5.5	5.3	6.0	5.7	6.2	5.8	5.2	5.1	4.2	4.1	4.4	5.1	5.3	5.3	5.1	5.1
5.4	5.5	4.8	4.7	4.7	5.0	5.3	5.2	5.0	4.2	4.0	5.0	4.8	4.4	3.3	2.6	2.8	2.7	2.8	2.8	3.5	3.8	4.2	4.6	4.9	5.9	6.0	4.9	4.3	3.8	4.1	3.4	3.5	3.1	3.8	5.0
3.7	4.4	4.4	4.9	5.2	5.1	4.6	4.6	5.3	4.6	4.4	4.6	4.7	4.4	3.3	2.4	2.2	2.6	2.5	2.1	2.5	2.7	2.3	1.7	2.5	2.7	1.6	1.0	1.1	1.0	1.0	.7	1.1	1.8	3.2	3.3
2.8	3.3	3.6	4.0	4.1	4.6	4.5	3.2	2.9	2.2	1.5	1.3	1.3	1.4	2.1	2.0	1.5	1.3	1.1	1.1	1.0	1.0	1.1	1.0	.7	.6	.8	1.0	1.0	.9	.8	.6	1.0	1.9	2.4	2.7

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



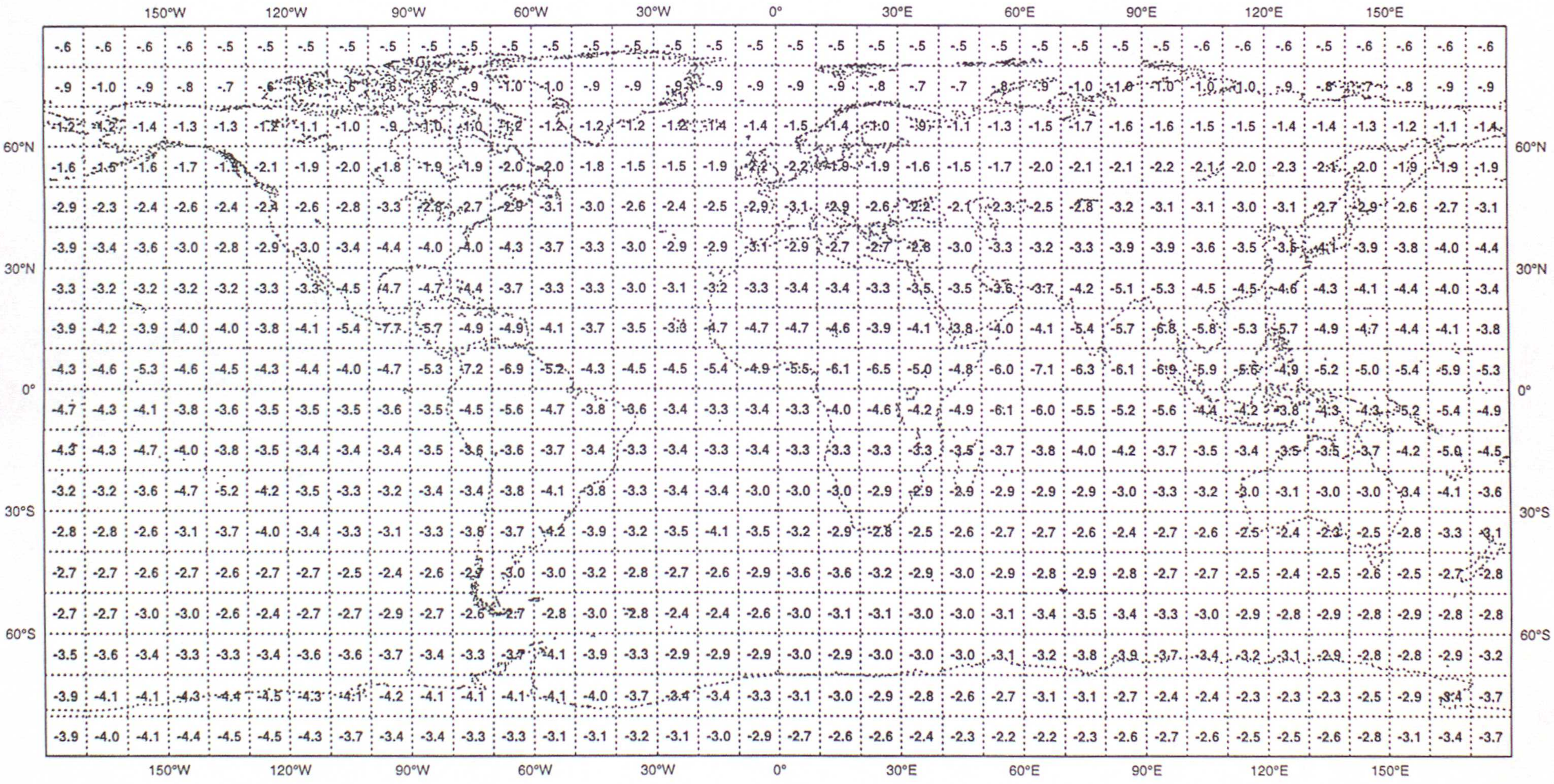
-.8	-.8	-1.0	-1.1	-1.3	-1.1	-1.1	-1.1	-1.2	-1.4	-1.3	-1.0	-1.0	-1.2	-1.2	-1.0	-1.0	-1.0	-1.1	-1.1	-1.0	-1.1	-1.1	-1.2	-.8	-.6	-.8	-1.1	-1.2	-1.1	-1.0	-.7	-.8	-1.0	-1.0	-.9
-.6	-.6	-.4	-.5	-.6	-.7	-1.4	-1.2	-1.2	-1.8	-2.0	-1.9	-1.7	-2.0	-1.9	-.4	-.2	-.6	-.9	-1.1	-1.3	-1.1	-1.5	-1.8	-1.5	-1.2	-.8	-1.0	-1.5	-1.5	-1.3	-1.3	-.9	-1.0	-1.3	-.8
-1.4	-1.6	-2.4	-2.4	-2.4	-2.1	-1.3	-1.1	-1.2	-2.1	-2.2	-2.6	-1.4	-2.3	-2.2	-1.9	-2.2	-1.6	-1.5	-2.0	-1.5	-1.4	-2.0	-2.4	-2.1	-1.7	-1.3	-1.5	-1.7	-1.8	-1.9	-2.8	-2.9	-2.5	-2.0	-2.0
-2.3	-1.9	-2.6	-2.4	-2.8	-3.5	-2.8	-3.0	-2.1	-2.2	-2.9	-3.2	-2.8	-2.7	-1.6	-1.9	-2.7	-2.4	-1.9	-1.4	-2.5	-1.9	-2.0	-2.4	-2.4	-1.1	-1.4	-2.6	-2.0	-2.2	-3.1	-2.5	-1.7	-1.9	-2.7	-3.0
-3.6	-2.0	-2.4	-2.4	-.5	-.2	-1.7	-3.7	-5.0	-2.7	-2.4	-3.0	-3.0	-2.9	-2.4	-1.1	-1.3	-2.2	-2.3	-2.8	-1.7	-.1	-.9	-1.2	-1.5	-1.9	-4.4	-3.9	-4.1	-3.5	-3.7	-2.1	-2.6	-1.6	-1.5	-3.1
-3.0	-1.9	-2.6	.1	1.0	1.3	-.4	-2.7	-5.4	-3.5	-3.7	-4.3	-2.1	-.4	-.1	.1	.7	-1.1	-.4	-.5	.0	.0	.4	-1.4	-.7	-1.2	-4.1	-5.3	-3.7	-2.6	-3.5	-3.8	-2.5	-2.7	-3.5	-4.5
.0	.5	.6	1.3	1.3	1.4	1.5	-3.9	-3.8	-4.5	-3.5	-.7	.2	.2	1.1	1.2	.3	-2.9	-2.5	-1.3	1.4	2.0	1.3	.6	-.6	-1.3	-2.0	-5.2	-2.9	-2.4	-3.2	-1.9	-1.5	-2.0	-.9	-.1
-.4	-1.5	-.4	.0	.0	.7	-.8	-4.4	-10.4	-5.5	-3.6	-3.5	-1.0	-.2	.3	.6	-5.4	-7.4	-6.5	-2.6	2.0	.5	.5	-.3	1.1	-4.1	-4.2	-8.8	-6.0	-3.3	-5.5	-2.5	-2.6	-1.3	-.6	-.1
-1.8	-2.8	-4.4	-2.2	-2.0	-1.6	-1.8	-.6	-2.6	-5.3	-11.0	-10.3	-4.7	-1.9	-2.7	-2.3	-5.6	-4.8	-7.1	-7.6	-7.8	-3.0	-2.2	-4.8	-8.3	-7.4	-6.6	-9.8	-6.8	-6.1	-3.5	-4.3	-3.7	-4.6	-6.2	-4.6
-2.8	-1.8	-.9	.2	1.1	1.2	1.3	1.1	.7	.2	-3.5	-6.4	-4.5	-1.7	-.2	1.3	1.5	1.6	1.5	-.8	-3.6	-1.6	-2.4	-5.6	-5.8	-5.5	-4.6	-5.7	-2.3	-1.4	-.1	-2.2	-2.0	-4.2	-4.9	-3.7
-1.7	-1.7	-3.1	-.9	.0	.7	1.3	1.4	1.3	1.1	.4	.0	-.9	-.5	.9	1.4	1.4	1.4	1.0	.4	-.6	.9	.9	.3	.2	-.5	-2.0	-.2	.5	.8	.9	.3	.1	-1.3	-3.7	-2.8
.0	-.1	-2.2	-5.3	-6.6	-2.9	-.5	.3	.1	.6	.6	-.4	-2.9	-1.8	.0	-.4	-.9	.6	1.1	.9	.1	-.1	.8	.6	.9	1.0	-.2	-1.6	-.8	.2	-.5	-.9	-.5	-1.2	-3.0	-1.3
-2.1	-1.8	-1.1	-2.9	-4.8	-5.2	-3.9	-4.0	-4.4	-3.4	-4.8	-3.7	-5.7	-5.2	-3.3	-4.4	-6.9	-3.8	-1.6	.1	.0	-.3	-.2	-1.1	-1.3	-.9	-1.2	-2.3	-1.6	-1.1	-1.0	-1.0	-1.5	-2.9	-3.9	-2.7
-2.9	-2.2	-1.8	-2.0	-1.8	-2.9	-4.3	-3.7	-3.2	-3.6	-4.5	-4.9	-4.9	-5.4	-3.9	-3.5	-3.3	-4.2	-6.2	-5.4	-3.5	-2.6	-3.5	-3.6	-2.7	-3.4	-2.7	-2.4	-2.4	-2.1	-2.5	-3.3	-3.3	-2.3	-2.8	-3.3
-4.1	-3.6	-3.8	-3.4	-2.3	-2.0	-3.4	-3.2	-3.9	-3.0	-3.4	-4.2	-4.5	-4.3	-3.8	-3.3	-3.3	-4.2	-5.1	-5.8	-5.5	-5.1	-5.7	-5.6	-6.2	-6.0	-4.4	-3.8	-3.1	-2.7	-2.8	-4.1	-4.2	-4.7	-4.4	-4.6
-6.2	-6.3	-5.3	-4.7	-4.6	-4.7	-4.4	-4.3	-4.7	-3.5	-3.6	-5.4	-6.6	-5.8	-4.2	-3.1	-2.9	-3.1	-3.4	-3.5	-4.1	-4.6	-4.9	-5.4	-5.2	-6.6	-6.9	-6.0	-4.9	-4.2	-4.5	-3.9	-4.2	-3.9	-4.0	-5.3
-5.2	-6.1	-5.9	-6.8	-7.4	-7.8	-6.4	-5.8	-5.7	-4.5	-4.9	-4.9	-5.6	-5.0	-4.3	-3.2	-3.1	-3.7	-3.6	-3.0	-2.4	-1.9	-2.2	-2.4	-3.2	-3.0	-2.4	-2.8	-3.6	-3.3	-3.0	-1.8	-2.7	-3.1	-4.4	-5.1
-5.3	-5.9	-5.9	-5.7	-5.1	-5.3	-5.1	-3.9	-2.5	-2.0	-2.2	-3.1	-3.0	-2.3	-2.9	-2.8	-2.8	-3.3	-3.1	-2.5	-1.6	-1.6	-2.5	-2.1	-2.0	-2.4	-3.4	-4.4	-4.4	-3.5	-2.9	-2.8	-3.3	-2.1	-3.9	-5.0

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



2.7	2.5	2.5	2.7	2.6	2.4	1.9	2.0	2.3	2.7	3.1	2.4	2.1	2.4	2.5	2.5	2.3	2.2	1.9	1.9	2.2	2.2	2.6	3.0	2.7	2.5	2.7	3.2	3.2	3.0	2.8	2.6	2.8	3.0	2.9	2.8
2.3	2.4	2.3	2.3	2.3	2.2	2.5	2.3	2.6	3.0	3.2	3.2	3.0	2.1	2.1	2.3	2.1	2.1	2.3	2.4	2.5	2.2	2.8	3.8	3.7	3.5	3.4	3.5	3.9	3.6	3.1	3.1	3.0	3.1	3.2	2.6
3.3	3.5	4.5	4.4	4.1	4.4	3.7	3.2	3.2	3.8	3.5	4.2	3.3	4.2	3.8	3.7	4.2	3.6	3.8	4.1	3.2	3.2	4.1	4.9	5.4	5.6	5.1	5.1	5.4	5.0	4.8	4.8	4.2	4.0	3.7	3.5
3.9	3.5	4.0	4.2	4.5	5.7	5.0	5.9	5.1	5.0	5.5	5.6	5.5	5.4	3.7	4.1	5.0	5.2	5.2	4.8	5.1	4.4	5.0	6.0	6.3	5.6	5.9	6.7	6.2	5.3	6.3	5.2	4.9	4.3	4.9	4.9
5.9	4.0	4.8	4.6	3.2	3.6	5.4	7.2	9.8	6.6	6.0	6.6	7.1	6.9	5.8	4.3	4.9	6.1	6.9	7.5	6.2	3.2	4.6	5.7	6.9	7.2	7.9	6.9	8.0	7.6	7.6	5.6	6.0	4.9	4.9	6.1
6.7	5.2	6.7	3.8	1.8	1.6	4.2	7.9	10.6	8.4	8.6	8.0	6.6	4.5	4.4	3.6	2.8	5.9	5.2	4.0	3.1	3.5	4.8	5.2	4.4	5.4	6.9	7.2	6.9	7.3	7.3	7.9	6.5	6.6	8.0	7.9
3.2	2.7	3.5	1.9	2.1	1.2	1.9	9.0	9.3	9.9	8.0	5.4	4.6	4.3	1.9	1.9	3.4	4.7	5.2	5.4	4.4	5.2	3.2	2.6	3.1	5.6	10.3	9.1	7.7	7.5	7.3	7.2	5.8	6.5	5.3	3.7
5.0	6.5	5.7	5.8	5.9	4.5	6.5	10.7	13.8	10.7	9.0	8.1	6.1	4.6	3.7	2.6	9.0	8.6	9.8	9.0	6.7	6.0	4.2	4.7	4.5	6.8	8.0	9.5	8.9	8.2	9.9	8.2	8.6	6.9	5.9	5.4
7.1	8.8	11.2	9.3	9.1	9.2	9.1	6.8	8.9	10.5	14.0	12.6	10.6	8.1	9.7	8.8	12.2	10.5	11.4	12.0	12.9	8.8	5.6	8.5	11.3	10.3	9.8	11.3	10.4	10.5	9.1	10.2	9.5	10.3	12.6	11.3
8.2	6.7	6.9	4.9	2.2	2.3	1.5	2.3	2.5	2.2	8.4	11.3	9.2	6.4	5.0	2.5	1.5	3.0	2.8	6.0	8.5	5.0	6.2	9.2	10.8	9.8	8.4	10.5	7.7	7.5	5.0	7.6	7.3	10.7	11.2	9.7
7.9	8.1	9.0	6.9	5.4	3.3	1.5	1.2	1.5	1.6	3.7	4.5	4.1	3.0	2.2	2.0	1.7	1.8	1.9	2.6	2.8	2.3	2.2	3.6	3.5	5.2	7.3	3.9	3.2	2.7	1.7	2.9	3.8	7.3	9.3	8.1
3.7	4.3	6.8	10.5	11.0	8.5	4.9	3.6	3.6	3.0	3.5	5.7	9.6	7.1	4.9	5.5	6.0	3.6	2.3	3.3	3.2	3.9	2.9	2.9	1.8	1.8	4.7	6.3	5.2	4.0	3.9	4.3	3.7	5.8	7.7	5.6
6.3	6.1	5.0	7.6	9.4	9.5	7.7	7.6	7.8	8.0	8.4	8.1	10.3	9.7	7.9	9.1	9.9	8.5	6.4	4.1	4.4	4.4	4.4	5.8	5.8	5.6	5.8	6.6	6.2	5.6	4.9	5.0	4.8	6.8	8.4	7.1
6.7	6.2	5.2	5.9	5.8	7.2	7.9	7.1	6.9	7.2	8.6	9.2	8.4	8.6	7.1	6.5	6.6	7.2	8.6	7.8	6.6	6.2	7.6	6.8	5.9	6.6	6.1	5.5	6.0	5.7	5.9	6.6	7.1	6.5	6.6	7.4
6.3	6.0	6.0	5.7	4.9	5.2	6.1	6.1	6.7	6.1	6.7	7.5	7.3	6.9	6.0	5.4	5.4	6.6	6.8	7.3	6.9	6.7	7.5	7.2	7.7	7.4	6.4	6.5	5.4	5.2	5.8	6.8	7.1	7.0	6.5	6.6
7.3	7.4	6.5	6.4	6.4	6.8	7.2	6.8	6.6	6.0	5.8	7.2	6.9	6.2	4.8	3.7	3.8	3.8	4.1	4.2	4.9	5.4	5.9	6.5	6.7	8.0	8.1	6.6	5.6	5.1	5.5	4.8	5.0	4.5	5.3	6.7
5.4	6.3	6.4	7.3	7.9	7.6	6.3	6.1	7.0	6.3	6.1	6.7	6.7	6.1	4.6	3.8	3.9	4.6	4.4	3.8	4.3	4.6	4.0	3.1	4.0	4.3	2.9	2.7	2.4	2.2	2.2	1.7	2.1	3.2	5.2	4.9
4.4	5.0	5.6	6.2	6.5	7.3	7.0	5.1	4.5	3.6	2.8	3.0	3.3	2.9	3.6	3.5	3.0	2.8	2.5	2.4	2.5	2.7	3.1	2.7	1.6	1.4	2.2	2.6	2.1	1.8	2.0	1.8	2.1	3.5	4.2	4.4

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



-.6	-.6	-.6	-.6	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.6	-.6	-.6	-.5	-.6	-.6	-.6	-.6
-.9	-1.0	-.9	-.8	-.7	-.6	-.6	-.5	-.6	-.8	-.9	-1.0	-1.0	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.8	-.7	-.7	-.8	-.9	-1.0	-1.0	-1.0	-1.0	-1.0	-.9	-.8	-.7	-.8	-.9	-.9
-1.2	-1.2	-1.4	-1.3	-1.3	-1.2	-1.1	-1.0	-.9	-1.0	-1.0	-1.2	-1.2	-1.2	-1.2	-1.2	-1.4	-1.4	-1.5	-1.4	-1.0	-.9	-1.1	-1.3	-1.5	-1.7	-1.6	-1.6	-1.5	-1.5	-1.4	-1.4	-1.3	-1.2	-1.1	-1.4
-1.6	-1.5	-1.6	-1.7	-1.9	-2.1	-1.9	-2.0	-1.8	-1.9	-1.9	-2.0	-2.0	-1.8	-1.5	-1.5	-1.9	-2.2	-2.2	-1.9	-1.9	-1.6	-1.5	-1.7	-2.0	-2.1	-2.1	-2.2	-2.1	-2.0	-2.3	-2.1	-2.0	-1.9	-1.9	-1.9
-2.9	-2.3	-2.4	-2.6	-2.4	-2.4	-2.6	-2.8	-3.3	-2.8	-2.7	-2.9	-3.1	-3.0	-2.6	-2.4	-2.5	-2.9	-3.1	-2.9	-2.6	-2.2	-2.1	-2.3	-2.5	-2.8	-3.2	-3.1	-3.1	-3.0	-3.1	-2.7	-2.9	-2.6	-2.7	-3.1
-3.9	-3.4	-3.6	-3.0	-2.8	-2.9	-3.0	-3.4	-4.4	-4.0	-4.0	-4.3	-3.7	-3.3	-3.0	-2.9	-2.9	-3.1	-2.9	-2.7	-2.7	-2.8	-3.0	-3.3	-3.2	-3.3	-3.9	-3.9	-3.6	-3.5	-3.5	-4.1	-3.9	-3.8	-4.0	-4.4
-3.3	-3.2	-3.2	-3.2	-3.2	-3.3	-3.3	-4.5	-4.7	-4.7	-4.4	-3.7	-3.3	-3.3	-3.0	-3.1	-3.2	-3.3	-3.4	-3.4	-3.3	-3.5	-3.5	-3.6	-3.7	-4.2	-5.1	-5.3	-4.5	-4.5	-4.6	-4.3	-4.1	-4.4	-4.0	-3.4
-3.9	-4.2	-3.9	-4.0	-4.0	-3.8	-4.1	-5.4	-7.7	-5.7	-4.9	-4.9	-4.1	-3.7	-3.5	-3.3	-4.7	-4.7	-4.7	-4.6	-3.9	-4.1	-3.8	-4.0	-4.1	-5.4	-5.7	-6.8	-5.8	-5.3	-5.7	-4.9	-4.7	-4.4	-4.1	-3.8
-4.3	-4.6	-5.3	-4.6	-4.5	-4.3	-4.4	-4.0	-4.7	-5.3	-7.2	-6.9	-5.2	-4.3	-4.5	-4.5	-5.4	-4.9	-5.5	-6.1	-6.5	-5.0	-4.8	-6.0	-7.1	-6.3	-6.1	-6.9	-5.9	-5.6	-4.9	-5.2	-5.0	-5.4	-5.9	-5.3
-4.7	-4.3	-4.1	-3.8	-3.6	-3.5	-3.5	-3.5	-3.6	-3.5	-4.5	-5.6	-4.7	-3.8	-3.6	-3.4	-3.3	-3.4	-3.3	-4.0	-4.6	-4.2	-4.9	-6.1	-6.0	-5.5	-5.2	-5.6	-4.4	-4.2	-3.8	-4.3	-4.3	-5.2	-5.4	-4.9
-4.3	-4.3	-4.7	-4.0	-3.8	-3.5	-3.4	-3.4	-3.4	-3.5	-3.6	-3.6	-3.7	-3.4	-3.3	-3.4	-3.3	-3.4	-3.3	-3.3	-3.3	-3.3	-3.5	-3.7	-3.8	-4.0	-4.2	-3.7	-3.5	-3.4	-3.5	-3.5	-3.7	-4.2	-5.0	-4.5
-3.2	-3.2	-3.6	-4.7	-5.2	-4.2	-3.5	-3.3	-3.2	-3.4	-3.4	-3.8	-4.1	-3.8	-3.3	-3.4	-3.4	-3.0	-3.0	-3.0	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9	-3.0	-3.3	-3.2	-3.0	-3.1	-3.0	-3.0	-3.4	-4.1	-3.6
-2.8	-2.8	-2.6	-3.1	-3.7	-4.0	-3.4	-3.3	-3.1	-3.3	-3.8	-3.7	-4.2	-3.9	-3.2	-3.5	-4.1	-3.5	-3.2	-2.9	-2.8	-2.5	-2.6	-2.7	-2.7	-2.6	-2.4	-2.7	-2.6	-2.5	-2.4	-2.3	-2.5	-2.8	-3.3	-3.1
-2.7	-2.7	-2.6	-2.7	-2.6	-2.7	-2.7	-2.5	-2.4	-2.6	-2.7	-3.0	-3.0	-3.2	-2.8	-2.7	-2.6	-2.9	-3.6	-3.6	-3.2	-2.9	-3.0	-2.9	-2.8	-2.9	-2.8	-2.7	-2.7	-2.5	-2.4	-2.5	-2.6	-2.5	-2.7	-2.8
-2.7	-2.7	-3.0	-3.0	-2.6	-2.4	-2.7	-2.7	-2.9	-2.7	-2.6	-2.7	-2.8	-3.0	-2.8	-2.4	-2.4	-2.6	-3.0	-3.1	-3.1	-3.0	-3.0	-3.1	-3.4	-3.5	-3.4	-3.3	-3.0	-2.9	-2.8	-2.9	-2.8	-2.9	-2.8	-2.8
-3.5	-3.6	-3.4	-3.3	-3.3	-3.4	-3.6	-3.6	-3.7	-3.4	-3.3	-3.7	-4.1	-3.9	-3.3	-2.9	-2.9	-2.9	-3.0	-2.9	-3.0	-3.0	-3.0	-3.1	-3.2	-3.8	-3.9	-3.7	-3.4	-3.2	-3.1	-2.9	-2.8	-2.8	-2.9	-3.2
-3.9	-4.1	-4.1	-4.3	-4.4	-4.5	-4.3	-4.1	-4.2	-4.1	-4.1	-4.1	-4.1	-4.0	-3.7	-3.4	-3.4	-3.3	-3.1	-3.0	-2.9	-2.8	-2.6	-2.7	-3.1	-3.1	-2.7	-2.4	-2.4	-2.3	-2.3	-2.3	-2.5	-2.9	-3.4	-3.7
-3.9	-4.0	-4.1	-4.4	-4.5	-4.5	-4.3	-3.7	-3.4	-3.4	-3.3	-3.3	-3.1	-3.1	-3.2	-3.1	-3.0	-2.9	-2.7	-2.6	-2.6	-2.4	-2.3	-2.2	-2.2	-2.3	-2.6	-2.7	-2.6	-2.5	-2.5	-2.6	-2.8	-3.1	-3.4	-3.7

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

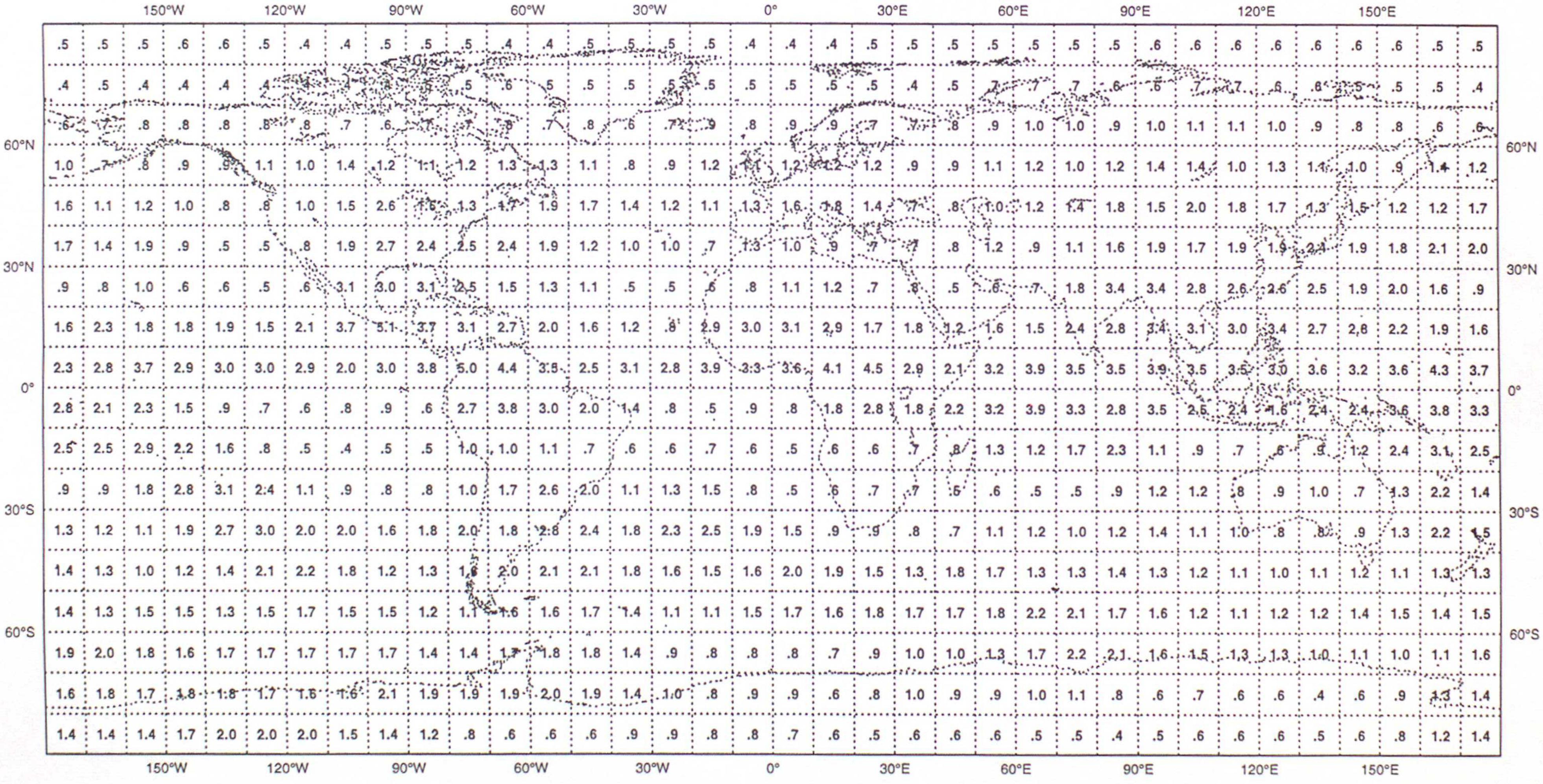
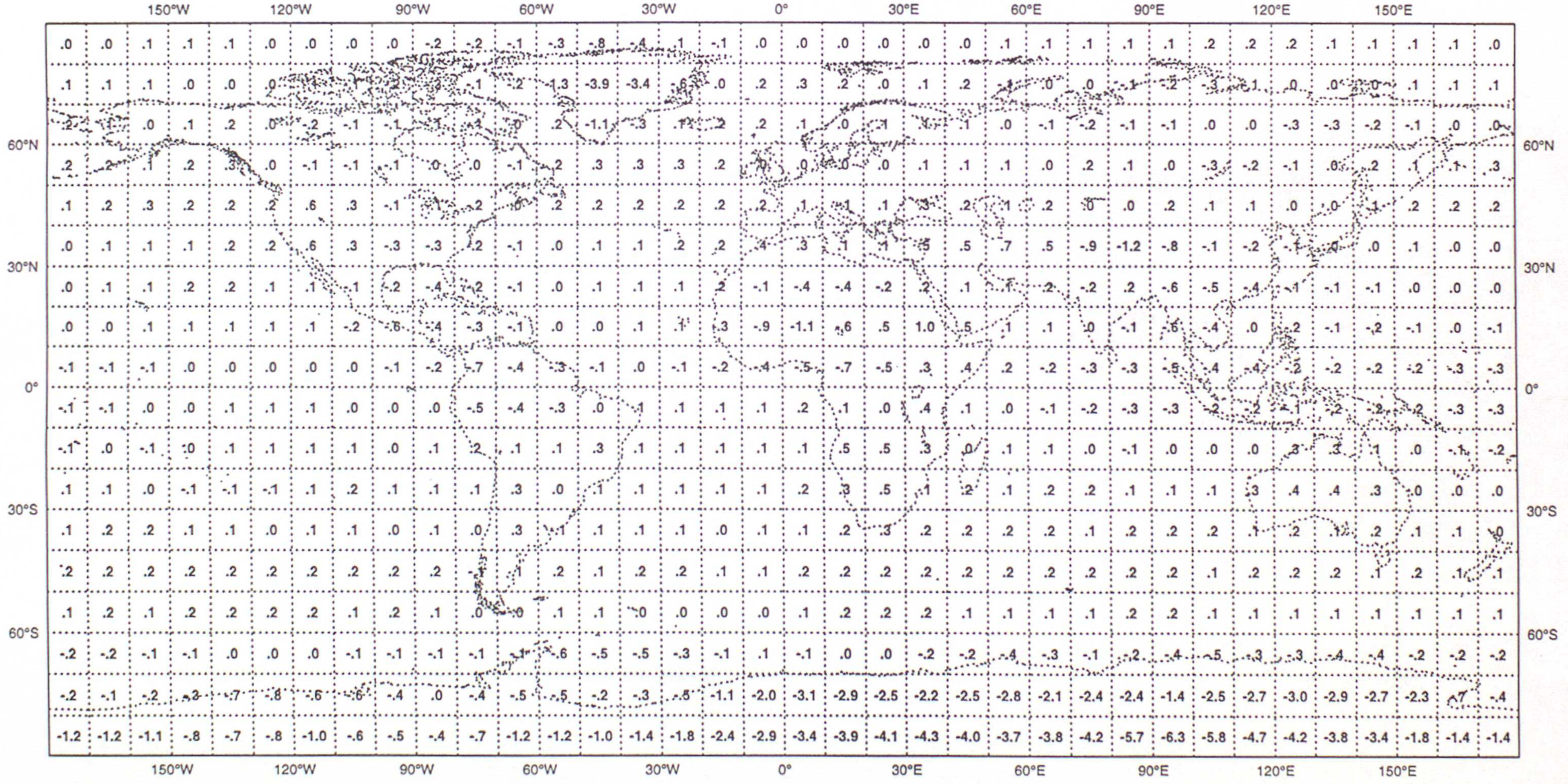

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .5 .6 .6 .5 .4 .4 .5 .5 .5 .4 .4 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .5 .5
.4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .7 .7 .7 .6 .6 .7 .7 .6 .6 .5 .5 .5 .4
.6 .7 .8 .8 .8 .8 .8 .7 .6 .7 .7 .8 .7 .8 .6 .7 .9 .8 .9 .9 .7 .7 .8 .9 1.0 1.0 .9 1.0 1.1 1.1 1.0 .9 .8 .8 .6 .6
1.0 .7 .8 .9 .9 1.1 1.0 1.4 1.2 1.1 1.2 1.3 1.3 1.1 .8 .9 1.2 1.1 1.2 1.2 1.2 .9 .9 1.1 1.2 1.0 1.2 1.4 1.4 1.0 1.3 1.1 1.0 .9 1.4 1.2
1.6 1.1 1.2 1.0 .8 .8 1.0 1.5 2.6 1.6 1.3 1.7 1.9 1.7 1.4 1.2 1.1 1.3 1.6 1.8 1.4 .7 .8 1.0 1.2 1.4 1.8 1.5 2.0 1.8 1.7 1.3 1.5 1.2 1.2 1.7
1.7 1.4 1.9 .9 .5 .5 .8 1.9 2.7 2.4 2.5 2.4 1.9 1.2 1.0 1.0 .7 1.3 1.0 .9 .7 .7 .8 1.2 .9 1.1 1.6 1.9 1.7 1.9 1.9 2.4 1.9 1.8 2.1 2.0
.9 .8 1.0 .6 .6 .5 .6 3.1 3.0 3.1 2.5 1.5 1.3 1.1 .5 .5 .6 .8 1.1 1.2 .7 .8 .5 .6 .7 1.8 3.4 3.4 2.8 2.6 2.6 2.5 1.9 2.0 1.6 .9
1.6 2.3 1.8 1.8 1.9 1.5 2.1 3.7 5.1 3.7 3.1 2.7 2.0 1.6 1.2 .8 2.9 3.0 3.1 2.9 1.7 1.8 1.2 1.6 1.5 2.4 2.8 3.4 3.1 3.0 3.4 2.7 2.8 2.2 1.9 1.6
2.3 2.8 3.7 2.9 3.0 3.0 2.9 2.0 3.0 3.8 5.0 4.4 3.5 2.5 3.1 2.8 3.9 3.3 3.6 4.1 4.5 2.9 2.1 3.2 3.9 3.5 3.5 3.9 3.5 3.5 3.0 3.6 3.2 3.6 4.3 3.7
2.8 2.1 2.3 1.5 .9 .7 .6 .8 .9 .6 2.7 3.8 3.0 2.0 1.4 .8 .5 .9 .8 1.8 2.8 1.8 2.2 3.2 3.9 3.3 2.8 3.5 2.5 2.4 1.6 2.4 2.4 3.6 3.8 3.3
2.5 2.5 2.9 2.2 1.6 .8 .5 .4 .5 .5 1.0 1.0 1.1 .7 .6 .6 .7 .6 .5 .6 .6 .7 .8 1.3 1.2 1.7 2.3 1.1 .9 .7 .6 .9 1.2 2.4 3.1 2.5
.9 .9 1.8 2.8 3.1 2.4 1.1 .9 .8 .8 1.0 1.7 2.6 2.0 1.1 1.3 1.5 .8 .5 .6 .7 .7 .5 .6 .5 .5 .9 1.2 1.2 .8 .9 1.0 .7 1.3 2.2 1.4
1.3 1.2 1.1 1.9 2.7 3.0 2.0 2.0 1.6 1.8 2.0 1.8 2.8 2.4 1.8 2.3 2.5 1.9 1.5 .9 .9 .8 .7 1.1 1.2 1.0 1.2 1.4 1.1 1.0 .8 .8 .9 1.3 2.2 1.5
1.4 1.3 1.0 1.2 1.4 2.1 2.2 1.8 1.2 1.3 1.6 2.0 2.1 2.1 1.8 1.6 1.5 1.6 2.0 1.9 1.5 1.3 1.8 1.7 1.3 1.3 1.4 1.3 1.2 1.1 1.0 1.1 1.2 1.1 1.3 1.3
1.4 1.3 1.5 1.5 1.3 1.5 1.7 1.5 1.5 1.2 1.1 1.6 1.6 1.7 1.4 1.1 1.1 1.5 1.7 1.6 1.8 1.7 1.7 1.8 2.2 2.1 1.7 1.6 1.2 1.1 1.2 1.2 1.4 1.5 1.4 1.5
1.9 2.0 1.8 1.6 1.7 1.7 1.7 1.7 1.7 1.4 1.4 1.7 1.8 1.8 1.4 .9 .8 .8 .8 .7 .9 1.0 1.0 1.3 1.7 2.2 2.1 1.6 1.5 1.3 1.3 1.0 1.1 1.0 1.1 1.6
1.6 1.8 1.7 1.8 1.8 1.7 1.6 1.6 2.1 1.9 1.9 1.9 2.0 1.9 1.4 1.0 .8 .9 .9 .6 .8 1.0 .9 .9 1.0 1.1 .8 .6 .7 .6 .6 .4 .6 .9 1.3 1.4
1.4 1.4 1.4 1.7 2.0 2.0 2.0 1.5 1.4 1.2 .8 .6 .6 .6 .9 .9 .8 .8 .7 .6 .5 .6 .6 .6 .5 .5 .4 .5 .6 .6 .6 .5 .6 .8 1.2 1.4

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations



.0	.0	.1	.1	.1	.0	.0	.0	.0	-.2	-.2	-.1	-.3	-.8	-.4	.1	-.1	.0	.0	.0	.0	.0	.0	.1	.1	.1	.1	.1	.2	.2	.2	.1	.1	.1	.1	.0
.1	.1	.1	.0	.0	.0	[illegible]	[illegible]	.2	.3	-.1	-.2	-1.3	-3.9	-3.4	-.6	.0	.2	.3	.2	.0	.1	.2	-.1	.0	.0	-.1	-.2	-.3	.1	.0	.0	.0	.1	.1	.1
.2	.1	.0	.1	.2	.0	-.2	-.1	-.1	-.1	-.1	.0	.2	-1.1	-.3	.1	.2	.2	.1	.0	-.1	.1	.1	.0	-.1	-.2	-.1	-.1	.0	.0	-.3	-.3	-.2	-.1	.0	.0
.2	.2	.1	.2	.3	.0	-.1	-.1	-.1	.0	.0	-.1	.2	.3	.3	.3	.2	.0	.0	.0	.0	.1	.1	.1	.0	.2	.1	.0	-.3	-.2	-.1	.0	.2	.1	.1	.3
.1	.2	.3	.2	.2	.2	.6	.3	-.1	-.1	.2	.0	.2	.2	.2	.2	.2	.2	.1	-.1	.1	.3	.2	.1	.2	.0	.0	.2	.1	.1	.0	.0	-.1	.2	.2	.2
.0	.1	.1	.1	.2	.2	.6	.3	-.3	-.3	.2	-.1	.0	.1	.1	.2	.2	.4	.3	.1	.1	.5	.5	.7	.5	-.9	-1.2	-.8	-.1	-.2	-.1	.0	.0	.1	.0	.0
.0	.1	.1	.2	.2	.1	.1	-.1	-.2	-.4	-.2	-.1	.0	.1	.1	.1	.2	-.1	-.4	-.4	-.2	.2	.1	.1	.2	-.2	.2	-.6	-.5	-.4	-.1	-.1	-.1	.0	.0	.0
.0	.0	.1	.1	.1	.1	.1	-.2	-.6	-.4	-.3	-.1	.0	.0	.1	.1	.3	-.9	-1.1	-.6	.5	1.0	.5	.1	.1	.0	-.1	-.6	-.4	.0	-.2	-.1	-.2	-.1	.0	-.1
-.1	-.1	-.1	.0	.0	.0	.0	.0	-.1	-.2	-.7	-.4	-.3	-.1	.0	-.1	-.2	-.4	-.5	-.7	-.5	.3	.4	.2	-.2	-.3	-.3	-.5	-.4	-.4	-.2	-.2	-.2	-.2	-.3	-.3
-.1	-.1	.0	.0	.1	.1	.1	.0	.0	.0	-.5	-.4	-.3	.0	.1	.1	.1	.1	.2	.1	.0	.4	.1	.0	-.1	-.2	-.3	-.3	-.2	-.2	-.1	-.2	-.2	-.2	-.3	-.3
-.1	.0	-.1	.0	.1	.1	.1	.1	.0	.1	.2	.1	.1	.3	.1	.1	.1	.1	.1	.5	.5	.3	.0	.1	.1	.0	-.1	.0	.0	.0	.3	.3	.1	.0	-.1	-.2
.1	.1	.0	-.1	-.1	-.1	.1	.2	.1	.1	.1	.3	.0	.1	.1	.1	.1	.1	.2	.3	.5	.1	.2	.1	.2	.2	.1	.1	.1	.3	.4	.4	.3	.0	.0	.0
.1	.2	.2	.1	.1	.0	.1	.1	.0	.1	.0	.3	.1	.1	.1	.1	.0	.1	.1	.2	.3	.2	.2	.2	.2	.1	.2	.2	.2	.1	.2	.1	.2	.1	.1	.0
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	-.1	.1	.2	.1	.2	.2	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.2	.2	.2	.1	.2	.1	.1
.1	.2	.1	.2	.2	.2	.2	.1	.2	.1	.0	.0	.1	.1	.0	.0	.0	.0	.1	.2	.2	.2	.1	.1	.1	.1	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1
-.2	-.2	-.1	-.1	.0	.0	.0	-.1	-.1	-.1	-.1	-.1	-.6	-.5	-.5	-.3	-.1	.1	-.1	.0	.0	-.2	-.2	-.4	-.3	-.1	-.2	-.4	-.5	-.3	-.3	-.4	-.4	-.2	-.2	-.2
-.2	-.1	-.2	-.3	-.7	-.8	-.6	-.6	-.4	.0	-.4	-.5	-.5	-.2	-.3	-.5	-1.1	-2.0	-3.1	-2.9	-2.5	-2.2	-2.5	-2.8	-2.1	-2.4	-2.4	-1.4	-2.5	-2.7	-3.0	-2.9	-2.7	-2.3	-.7	-.4
-1.2	-1.2	-1.1	-.8	-.7	-.8	-1.0	-.6	-.5	-.4	-.7	-1.2	-1.2	-1.0	-1.4	-1.8	-2.4	-2.9	-3.4	-3.9	-4.1	-4.3	-4.0	-3.7	-3.8	-4.2	-5.7	-6.3	-5.8	-4.7	-4.2	-3.8	-3.4	-1.8	-1.4	-1.4

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

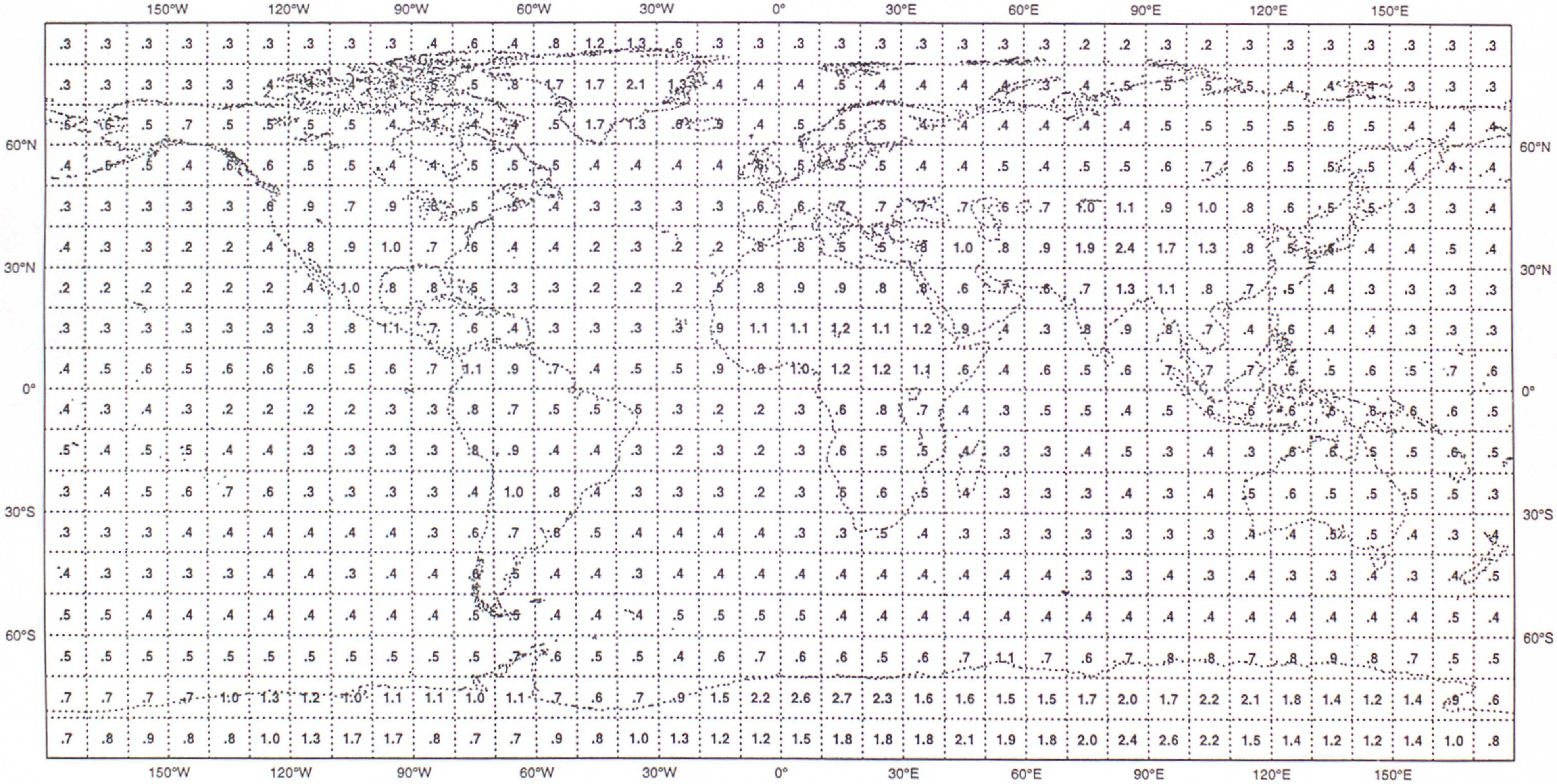

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .6 .4 .8 1.2 1.3 .6 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .2 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .4 .4 .4 .4 .5 .5 .8 1.7 1.7 2.1 1.3 .4 .4 .4 .5 .4 .4 .4 .4 .3 .4 .5 .5 .5 .5 .4 .4 .4 .3 .3 .3
.5 .6 .5 .7 .5 .5 .5 .5 .4 .4 .4 .4 .5 1.7 1.3 .6 .5 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .6 .5 .4 .4 .4
.4 .5 .5 .4 .6 .6 .5 .5 .4 .4 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .5 .4 .5 .5 .6 .7 .6 .5 .5 .5 .4 .4 .4
.3 .3 .3 .3 .3 .6 .9 .7 .9 .6 .5 .5 .4 .3 .3 .3 .3 .6 .6 .7 .7 .7 .7 .6 .7 1.0 1.1 .9 1.0 .8 .6 .5 .5 .3 .3 .4
.4 .3 .3 .2 .2 .4 .8 .9 1.0 .7 .6 .4 .4 .2 .3 .2 .2 .8 .8 .5 .5 .8 1.0 .8 .9 1.9 2.4 1.7 1.3 .8 .5 .6 .4 .4 .5 .4
.2 .2 .2 .2 .2 .2 .4 1.0 .8 .8 .5 .3 .3 .2 .2 .2 .5 .8 .9 .9 .8 .8 .6 .7 .6 .7 1.3 1.1 .8 .7 .5 .4 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .8 1.1 .7 .6 .4 .3 .3 .3 .3 .9 1.1 1.1 1.2 1.1 1.2 .9 .4 .3 .8 .9 .8 .7 .4 .6 .4 .4 .3 .3 .3
.4 .5 .6 .5 .6 .6 .6 .5 .6 .7 1.1 .9 .7 .4 .5 .5 .9 .8 1.0 1.2 1.2 1.1 .6 .4 .6 .5 .6 .7 .7 .7 .6 .5 .6 .5 .7 .6
.4 .3 .4 .3 .2 .2 .2 .2 .3 .3 .8 .7 .5 .5 .6 .3 .2 .2 .3 .6 .8 .7 .4 .3 .5 .5 .4 .5 .6 .6 .6 .6 .6 .6 .6 .5
.5 .4 .5 .5 .4 .4 .3 .3 .3 .3 .8 .9 .4 .4 .3 .2 .3 .2 .3 .6 .5 .5 .4 .3 .3 .4 .5 .3 .4 .3 .6 .6 .5 .5 .6 .5
.3 .4 .5 .6 .7 .6 .3 .3 .3 .3 .4 1.0 .8 .4 .3 .3 .3 .2 .3 .5 .6 .5 .4 .3 .3 .3 .4 .3 .4 .5 .6 .5 .5 .5 .5 .3
.3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .6 .7 .8 .5 .4 .4 .4 .4 .3 .3 .5 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .5 .4 .3 .4
.4 .3 .3 .3 .3 .4 .4 .3 .4 .4 .6 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .3 .3 .4 .3 .4 .5
.5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .7 .6 .5 .5 .4 .6 .7 .6 .6 .5 .6 .7 1.1 .7 .6 .7 .8 .8 .7 .8 .9 .8 .7 .5 .5
.7 .7 .7 .7 1.0 1.3 1.2 1.0 1.1 1.1 1.0 1.1 .7 .6 .7 .9 1.5 2.2 2.6 2.7 2.3 1.6 1.6 1.5 1.5 1.7 2.0 1.7 2.2 2.1 1.8 1.4 1.2 1.4 .9 .6
.7 .8 .9 .8 .8 1.0 1.3 1.7 1.7 .8 .7 .7 .9 .8 1.0 1.3 1.2 1.2 1.5 1.8 1.8 1.8 2.1 1.9 1.8 2.0 2.4 2.6 2.2 1.5 1.4 1.2 1.2 1.4 1.0 .8

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

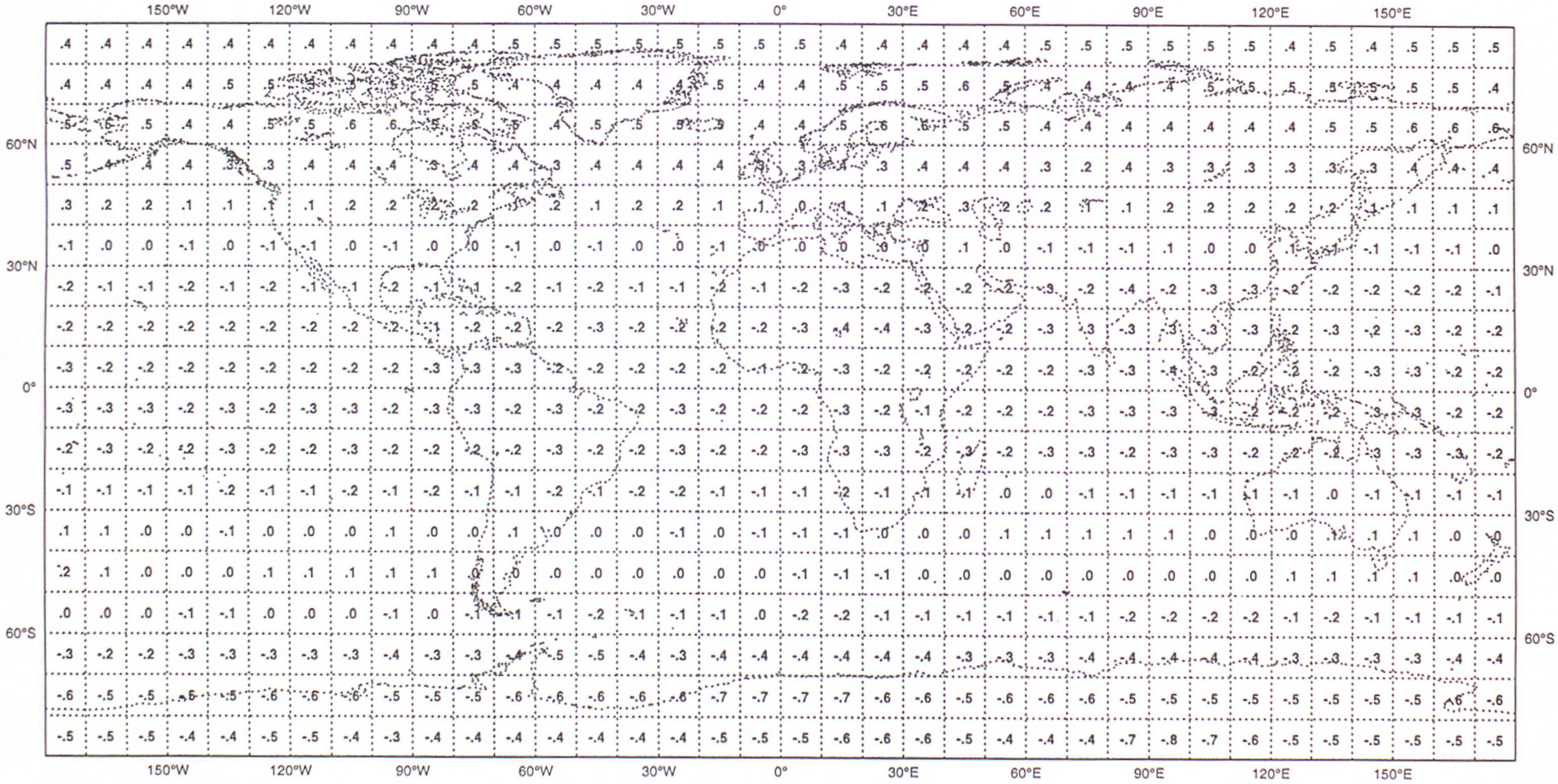

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

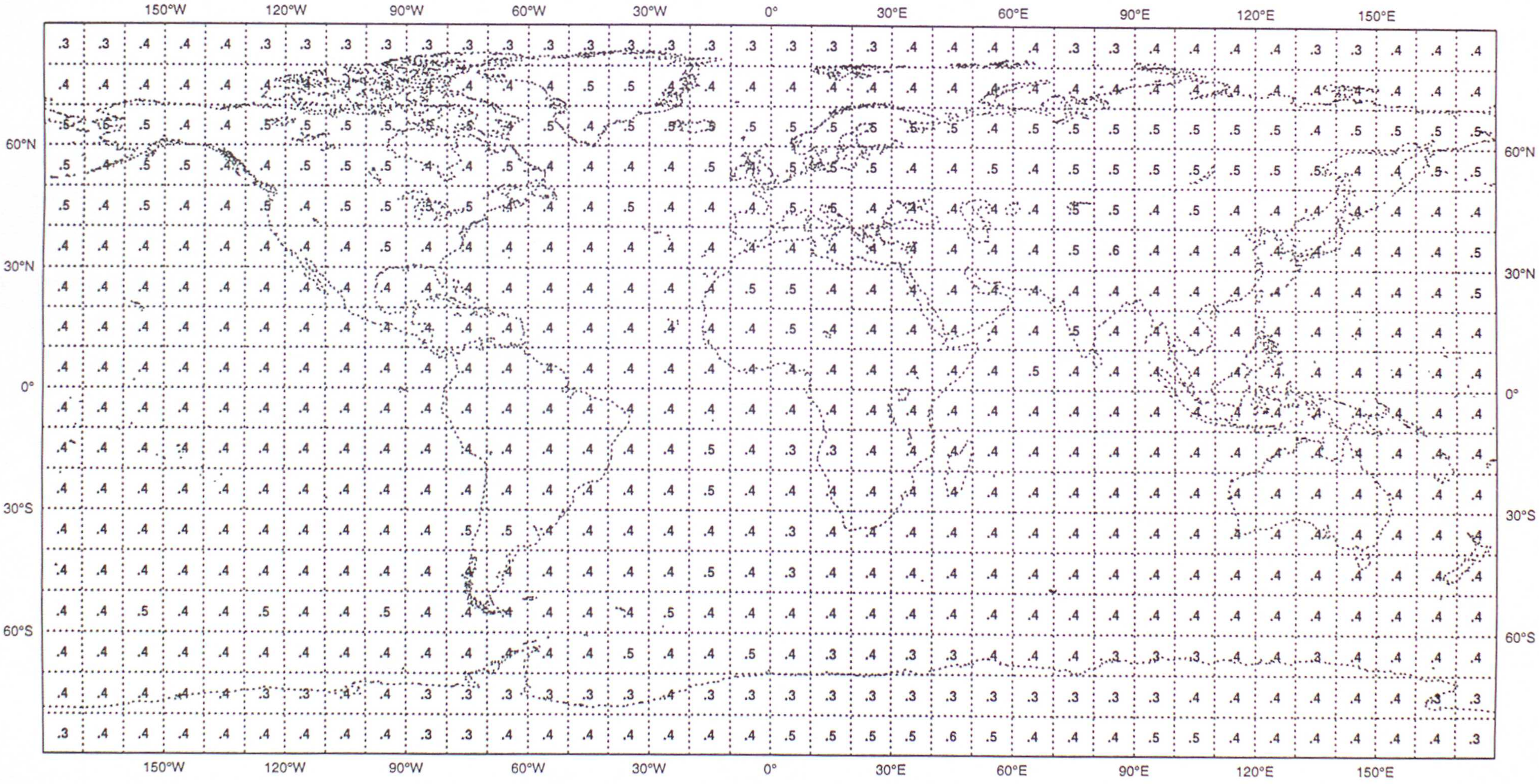

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

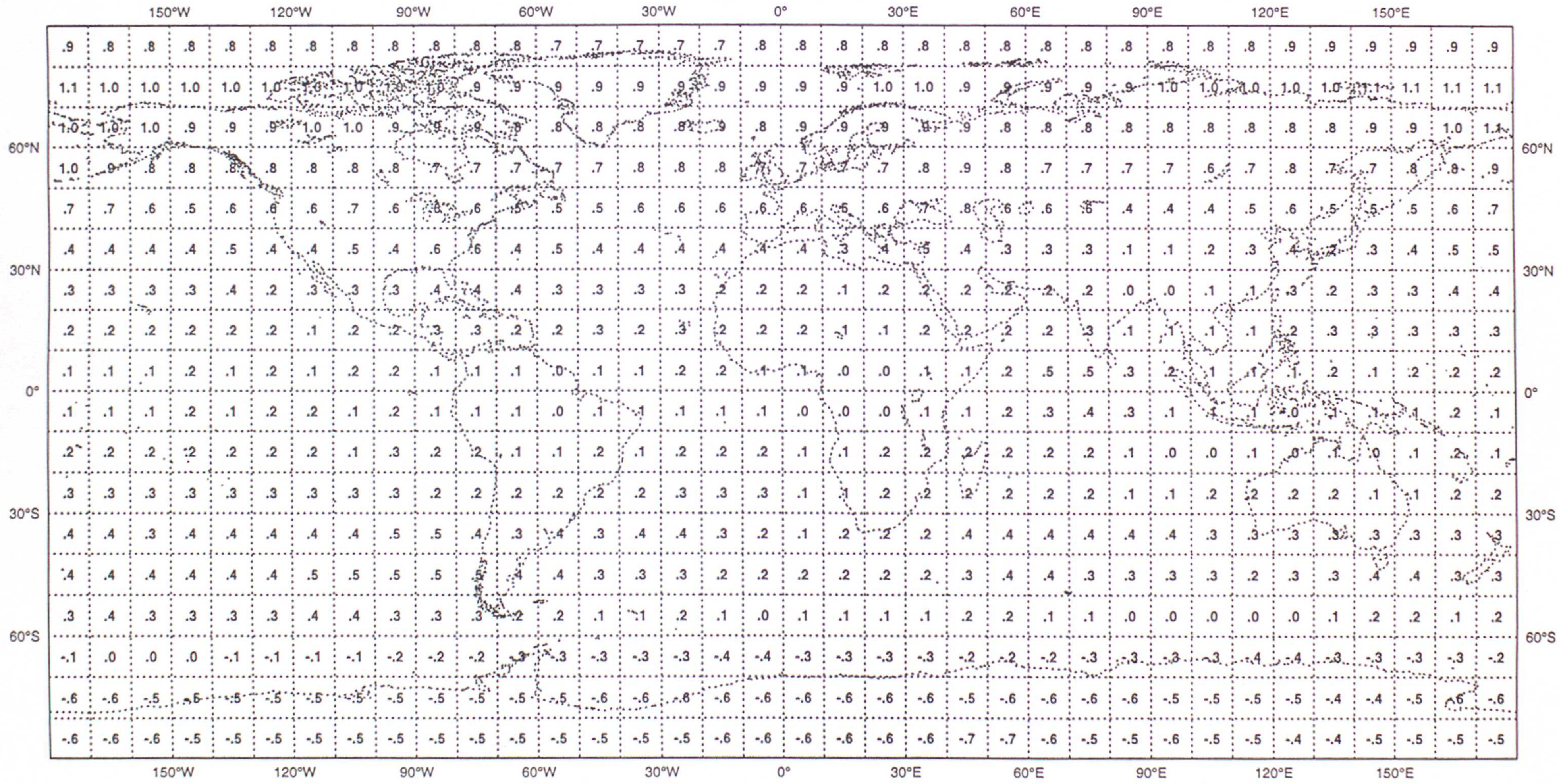

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9
1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 1.0 1.0 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1
1.0 1.0 1.0 .9 .9 .9 1.0 1.0 .9 .9 .9 .8 .8 .8 .8 .8 .9 .8 .9 .9 .9 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 1.0 1.1
1.0 .9 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .7 .7 .7 .7 .8 .9 .8 .7 .7 .7 .7 .6 .7 .8 .7 .7 .8 .8 .9
.7 .7 .6 .5 .6 .6 .6 .7 .6 .6 .6 .5 .5 .5 .6 .6 .6 .6 .6 .5 .6 .7 .8 .6 .6 .6 .4 .4 .4 .5 .6 .5 .5 .5 .6 .7
.4 .4 .4 .4 .5 .4 .4 .5 .4 .6 .6 .4 .5 .4 .4 .4 .4 .4 .4 .3 .4 .5 .4 .3 .3 .3 .1 .1 .2 .3 .4 .2 .3 .4 .5 .5
.3 .3 .3 .3 .4 .2 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .0 .0 .1 .1 .3 .2 .3 .3 .4 .4
.2 .2 .2 .2 .2 .2 .1 .2 .2 .3 .3 .2 .2 .3 .2 .3 .2 .2 .2 .1 .1 .2 .2 .2 .2 .3 .1 .1 .1 .1 .2 .3 .3 .3 .3 .3
.1 .1 .1 .2 .1 .2 .1 .2 .2 .1 .1 .1 .0 .1 .1 .2 .2 .1 .1 .0 .0 .1 .1 .2 .5 .5 .3 .2 .1 .1 .1 .2 .1 .2 .2 .2
.1 .1 .1 .2 .1 .2 .2 .1 .2 .1 .1 .1 .0 .1 .1 .1 .1 .1 .0 .0 .0 .1 .1 .2 .3 .4 .3 .1 .1 .1 .0 .1 .1 .1 .2 .1
.2 .2 .2 .2 .2 .2 .2 .1 .3 .2 .2 .1 .1 .2 .1 .2 .2 .2 .1 .1 .2 .2 .2 .2 .2 .2 .1 .0 .0 .1 .0 .1 .0 .1 .2 .1
.3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .3 .3 .3 .1 .1 .2 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .2 .1 .1 .2 .2
.4 .4 .3 .4 .4 .4 .4 .4 .5 .5 .4 .3 .4 .3 .4 .4 .3 .2 .1 .2 .2 .2 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .4 .4 .3 .3 .3 .2 .2 .2 .2 .2 .2 .3 .4 .4 .3 .3 .3 .3 .2 .3 .3 .4 .4 .3 .3
.3 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .2 .2 .1 .1 .2 .1 .0 .1 .1 .1 .1 .2 .2 .1 .1 .0 .0 .0 .0 .0 .1 .2 .2 .1 .2
-.1 .0 .0 .0 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.4 -.4 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.4 -.4 -.3 -.3 -.3 -.3 -.2
-.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.5 -.6 -.6 -.6 -.6 -.5 -.5 -.5 -.5 -.4 -.4 -.5 -.6 -.6
-.6 -.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.6 -.5 -.5 -.6 -.5 -.5 -.4 -.4 -.5 -.5 -.5 -.5

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

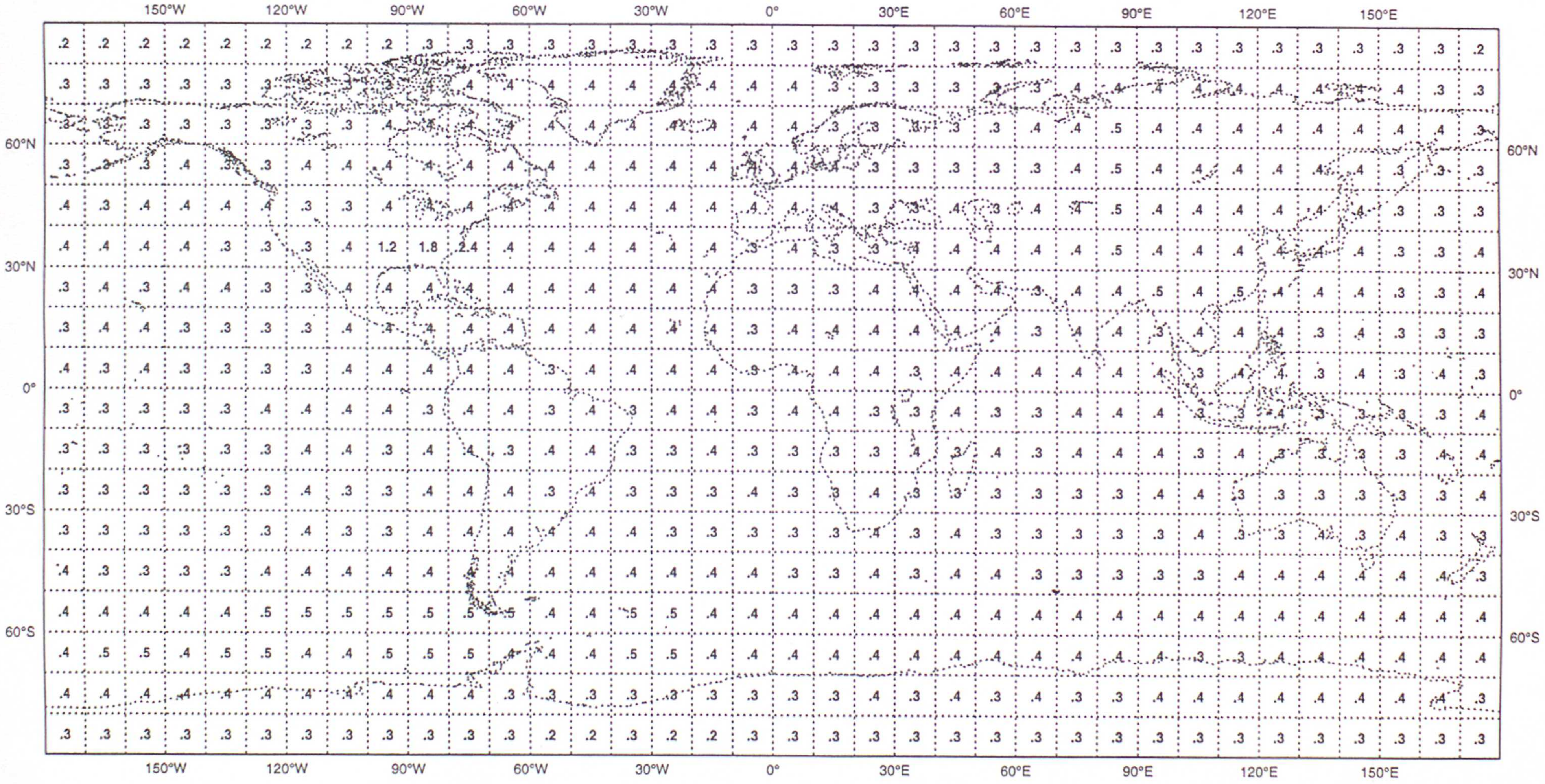

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3
.4 .3 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3
.4 .4 .4 .4 .3 .3 .3 .4 1.2 1.8 2.4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .4
.3 .4 .3 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .3 .4 .4 .5 .4 .5 .4 .4 .4 .3 .3 .4
.3 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .3 .4 .3 .3 .3
.4 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .3 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .4 .3 .4 .3
.3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .4 .4 .3 .4 .3 .4 .4 .3 .4 .4 .3 .3 .4 .3 .3 .4 .4 .4 .3 .3 .4 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .4 .3 .4 .4 .3 .3 .4 .3 .3 .3 .3 .4 .3 .4 .3 .4 .4 .4 .3 .4 .3 .3 .3 .3 .4 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .3 .4 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .4 .3 .3
.4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3
.4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .5 .5 .4 .5 .5 .4 .4 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed ($m\ s^{-1}$)
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the wind observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 $m\ s^{-1}$ (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
13599	18.2	-29.0	P	420	0	0	0.8	1.0	1.3
13600	16.7	-24.6	P	598	0	33	0.5	-0.1	0.5
26501	70.3	-19.8	P	332	0	47	0.6	0.0	0.6
41503	20.5	-73.7	P	582	1	11	1.2	-1.2	1.7
41522	21.2	-55.9	P	602	0	0	0.5	-1.3	1.4
41531	25.1	-59.6	P	625	0	0	0.5	0.8	0.9
41532	22.3	-68.1	P	598	0	0	0.5	0.9	1.0
41534	26.7	-60.4	P	610	0	0	0.5	0.4	0.6
41537	28.8	-60.5	P	601	0	0	0.5	0.7	0.9
41649	16.3	-61.1	P	554	0	100	0.6	-4.3	4.4
41658	45.7	-22.3	P	612	0	0	0.5	-1.4	1.5
41659	29.0	-31.9	P	634	0	0	0.4	-0.2	0.4
41666	33.9	-47.6	P	634	0	0	0.4	0.5	0.7
44551	42.6	-57.0	P	405	0	1	0.6	0.2	0.6
44585	42.9	-69.0	P	739	4	68	1.1	0.9	1.4
44601	34.9	-44.8	P	614	0	12	0.5	-0.8	0.9
44603	55.7	-31.2	P	690	0	11	0.8	-0.2	0.8
44605	53.3	-42.2	P	700	0	10	0.6	-0.4	0.7
44606	31.9	-52.6	P	1023	0	39	0.4	0.0	0.4
44608	36.2	-33.3	P	805	0	23	0.7	0.2	0.7
44609	55.8	-19.3	P	1117	0	44	0.8	-1.0	1.2
44610	42.5	-34.3	P	1421	0	55	0.9	-0.1	0.9
44611	56.2	-23.9	P	725	3	15	0.6	-0.1	0.6
44613	53.4	-27.7	P	669	1	11	0.9	-0.4	1.0
44614	59.4	-42.7	P	1332	0	54	0.8	-0.7	1.0
44615	44.8	-34.0	P	784	0	20	0.6	-1.5	1.6
44620	41.7	-30.3	P	661	0	8	0.5	0.1	0.5
44621	56.4	-40.9	P	658	0	9	0.6	-0.2	0.6
44622	48.6	-33.0	P	674	0	8	0.8	-0.3	0.9
44623	37.9	-72.2	P	458	0	2	0.5	0.3	0.6
44626	38.8	-71.0	P	448	0	2	0.9	0.4	1.0
44628	39.7	-59.8	P	451	0	2	1.0	-0.4	1.1
44630	39.5	-62.5	P	462	0	2	0.8	0.8	1.2
44723	39.1	-19.3	P	669	0	8	0.6	-0.1	0.6
44726	60.2	-47.8	P	1441	0	54	0.7	-0.4	0.8
44730	54.9	-31.5	P	1749	0	63	0.6	-0.5	0.7
44741	39.4	-71.9	P	466	0	1	0.5	-0.2	0.6
44764	57.5	-20.7	P	1931	0	67	0.6	-0.4	0.7
44767	60.7	-11.7	P	725	0	15	0.8	-0.2	0.8
44769	59.5	-33.5	P	16	13	56	2.5	5.2	5.7
44773	41.7	-22.2	P	984	0	60	2.4	-1.0	2.7
44774	44.0	-12.2	P	276	0	17	0.7	-0.1	0.7
44776	51.0	-15.5	P	375	0	36	2.7	0.4	2.7
44777	41.1	-31.8	P	397	0	26	0.5	0.1	0.5
44778	43.4	-42.6	P	483	0	31	0.8	-0.1	0.8
44779	51.8	-31.8	P	496	0	34	0.8	0.0	0.8
44780	56.5	-48.4	P	712	0	48	0.7	-0.1	0.7
47554	73.1	-76.3	P	489	0	33	0.7	0.3	0.7
48589	68.2	-27.4	P	405	0	2	0.8	-0.3	0.9
62505	63.7	-15.3	P	753	0	17	1.0	0.1	1.0
62507	54.2	-11.9	P	19	0	95	1.6	4.5	4.7
62508	43.9	-2.5	P	681	0	9	0.7	-0.9	1.1
62513	35.2	-25.5	P	670	0	7	0.5	0.3	0.6
62514	30.9	-23.7	P	655	0	7	0.4	-0.1	0.4
62515	20.4	-32.2	P	721	0	11	0.4	-0.1	0.4
62517	30.5	-21.6	P	726	0	13	0.4	-0.5	0.6
62519	46.9	-4.4	P	1116	0	46	0.6	-0.6	0.9
62520	48.8	-16.4	P	623	0	13	0.4	1.1	1.2
62551	43.7	-24.8	P	656	0	6	0.5	0.9	1.0
62552	37.3	-21.9	P	670	0	7	0.5	0.3	0.6

62553	34.4	-17.5	P	688	0	8	0.4	0.1	0.5
62554	40.8	-19.8	P	676	0	10	1.6	0.3	1.7
62573	47.4	-13.1	P	368	1	17	1.7	0.2	1.7
62597	36.2	-15.3	P	277	0	1	0.5	-0.1	0.5
62599	59.8	-9.0	P	646	0	47	0.6	0.1	0.6
62600	51.0	-9.0	P	452	0	34	0.4	0.1	0.4
626069	33.1	-72.3	P	1	0	0	0.0	-0.5	0.5
62696	49.9	-46.6	P	471	46	80	4.8	3.7	6.0
62711	51.8	-50.8	P	662	0	12	0.7	-0.1	0.7
62712	56.0	-42.3	P	763	0	17	0.9	0.0	0.9
62801	40.0	-25.8	P	997	0	39	0.9	0.7	1.1
62802	41.1	-22.7	P	669	0	8	0.5	-0.1	0.6
62803	45.2	-13.7	P	647	0	7	0.9	-0.3	0.9
62804	46.4	-10.3	P	682	0	10	0.6	-0.7	0.9
64606	60.2	-51.5	P	22	0	50	2.0	-1.1	2.3

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
13599	18.2	-29.0	SPEED	416	0	100	0.8	-1.4	1.7
13600	16.7	-24.6	SPEED	583	0	100	1.4	-0.9	1.6
41503	20.5	-73.7	SPEED	569	65	100	5.0	3.0	5.9
41522	21.2	-55.9	SPEED	597	0	100	1.2	-0.2	1.2
41531	25.1	-59.6	SPEED	618	0	100	1.2	-0.7	1.4
41532	22.3	-68.1	SPEED	596	0	100	1.3	-0.6	1.4
41534	26.7	-60.4	SPEED	583	3	100	2.2	-0.4	2.3
41537	28.8	-60.5	SPEED	599	0	100	3.2	1.9	3.7
44551	42.6	-57.0	SPEED	334	0	100	2.3	0.0	2.3
44585	42.9	-69.0	SPEED	719	4	100	3.0	1.2	3.2
44601	34.9	-44.8	SPEED	605	1	100	2.4	-1.6	2.9
44615	44.8	-34.0	SPEED	781	0	100	2.5	0.7	2.6
44620	41.7	-30.3	SPEED	650	0	100	1.9	-0.2	1.9
62573	47.4	-13.1	SPEED	305	2	100	2.6	-0.3	2.6
626069	33.1	-72.3	SPEED	1	0	100	0.0	6.8	6.8
62711	51.8	-50.8	SPEED	657	0	100	2.0	1.3	2.4

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
13599	18.2	-29.0	DIRN.	340	0	0	14.2	-18.2	23.1
13600	16.7	-24.6	DIRN.	404	0	0	16.5	34.2	37.9
41503	20.5	-73.7	DIRN.	446	83	0	27.5	-14.8	31.2
41522	21.2	-55.9	DIRN.	439	0	0	10.3	-10.4	14.7
41531	25.1	-59.6	DIRN.	265	0	0	10.8	34.7	36.4
41532	22.3	-68.1	DIRN.	501	0	0	10.8	38.0	39.6
41534	26.7	-60.4	DIRN.	188	9	0	14.8	12.2	19.2
41537	28.8	-60.5	DIRN.	242	1	0	28.4	-12.9	31.2
44551	42.6	-57.0	DIRN.	185	0	0	24.0	21.0	31.8
44585	42.9	-69.0	DIRN.	332	10	0	54.3	49.5	73.5
44601	34.9	-44.8	DIRN.	252	3	0	21.4	-4.2	21.8
44615	44.8	-34.0	DIRN.	608	0	0	17.0	-0.6	17.0
44620	41.7	-30.3	DIRN.	484	0	0	18.7	4.5	19.2
62573	47.4	-13.1	DIRN.	224	3	0	27.6	13.5	30.7
626069	33.1	-72.3	DIRN.	1	0	0	0.0	64.5	64.5
62711	51.8	-50.8	DIRN.	463	0	0	26.3	-1.5	26.4

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	686	0	10	1.9	0.3	597	0	11	0	8.0	0.0
ACA	1479	1	2	1.6	-0.3	1363	0	2	0	6.2	0.6
AEA	149	0	4	1.5	0.6	63	0	8	0	7.6	0.1
AEL	143	0	12	1.6	-0.2	130	0	15	0	9.4	0.2
AEW	61	0	5	2.2	-1.1	63	0	13	0	10.1	1.5
AFL	405	0	6	2.1	0.5	375	0	4	0	7.5	1.2
AFR	725	1	5	1.6	0.0	606	0	6	0	7.5	0.4
AIS	124	1	12	2.2	-0.3	113	0	15	0	11.5	-0.2
AJM	263	0	4	1.6	-0.1	235	0	6	0	9.1	0.7
AMM	76	1	7	1.7	0.2	60	0	8	0	9.2	1.6
AMT	51	2	14	1.5	0.2	52	0	15	0	7.3	0.2
AMX	200	2	3	1.6	0.5	147	0	2	0	7.6	-0.4
AZA	280	1	7	1.9	-0.3	276	0	9	0	9.7	0.4
BAF	34	0	0	1.6	-0.7	35	0	0	0	5.2	1.4
BAL	85	0	7	1.2	0.3	78	0	10	0	8.7	-0.1
BAW	428	0	7	1.8	-0.5	399	0	8	0	7.2	0.1
BPA	84	2	12	2.3	-0.3	67	1	13	0	11.1	-0.5
BWA	106	0	6	1.5	0.0	74	0	3	0	5.7	0.0
CFC	29	0	10	1.9	0.5	29	0	21	0	12.7	2.2
CFG	379	0	4	1.5	-0.5	331	0	4	0	5.8	-0.1
CFY	30	0	0	1.4	-0.3	28	0	0	0	4.1	1.5
CGA	145	0	4	1.4	-0.3	127	0	2	0	4.2	1.0
CGF	100	0	4	1.3	-0.5	87	0	2	0	3.6	1.0
CGH	211	0	1	1.1	-0.4	183	0	1	0	3.6	0.7
CKS	199	1	10	2.4	0.5	201	0	10	0	9.5	0.1
CLX	263	1	3	1.7	-0.5	232	0	4	0	6.6	0.4
COA	104	0	48	1.2	-0.1	65	0	48	0	6.7	0.6
CRL	195	2	7	1.9	0.4	147	0	3	0	7.4	0.5
CSA	37	0	3	1.7	-0.6	36	0	3	0	6.3	1.3
CUB	56	2	4	1.7	0.1	40	0	13	0	13.5	-0.5
DAB	412	0	9	1.4	-0.1	381	0	9	0	3.9	0.5
DAI	380	0	2	1.3	0.3	356	0	2	0	4.1	0.9
DAL	801	1	7	1.7	-0.4	776	0	8	0	7.5	0.6
DBR	41	0	0	1.7	-0.7	40	0	5	0	8.2	-0.5
DCE	111	1	14	1.4	-0.9	106	0	18	0	7.4	-0.4
DCS	23	0	0	1.4	-0.3	23	0	4	0	9.0	1.6
DHL	158	3	100	6.5	-6.3	154	0	100	0	25.3	9.0
DLH	634	1	12	1.5	-0.2	599	0	10	0	6.9	0.8
EDW	29	0	0	1.3	-0.1	24	0	0	0	5.2	1.7
EEZ	25	0	8	1.7	0.3	25	0	4	0	5.1	0.2
EIA	217	0	23	2.9	1.5	223	1	100	0	21.1	7.3
ELY	185	1	3	1.5	-0.1	171	0	4	0	7.6	0.5
ETH	28	0	14	1.4	0.8	29	7	24	0	8.2	2.1
FDX	724	1	37	1.5	0.3	730	0	36	0	7.6	0.6
FGS	161	0	1	1.4	0.1	145	0	1	0	4.4	0.9
FGZ	37	0	3	1.4	-0.6	34	0	3	0	4.1	1.3
FIN	282	1	5	1.7	-0.1	253	0	5	0	7.1	0.7
GAF	32	0	3	1.6	-1.1	32	0	6	0	5.6	0.6
GCO	246	0	5	1.6	0.1	249	0	100	0	9.9	2.0
GOJ	68	0	1	1.1	0.1	64	0	2	0	3.6	1.1
GRL	88	0	2	1.4	0.1	77	0	4	0	4.5	0.4
GTI	81	0	7	1.7	-0.2	78	0	6	0	5.3	0.0
GVB	52	0	4	1.6	-0.1	46	0	4	0	4.4	1.8
GVF	51	0	2	1.4	-0.6	49	0	2	0	3.9	0.1
GVG	51	0	2	1.1	-0.4	49	0	2	0	3.8	0.7
GVH	52	0	6	1.5	-0.7	47	0	2	0	4.1	0.5
GVL	33	0	0	1.4	0.1	33	0	0	0	4.3	0.9
GVR	133	0	1	1.0	0.0	124	0	0	0	4.2	0.2
GVW	38	0	0	1.3	-0.6	35	0	0	0	3.7	0.7

TEMPERATURE WIND

IDENT. N.REP. PG PR RMS BIAS N.REP. PG PR PC RMS BIAS

GVX	30	0	0	1.2	0.0	25	0	0	0	3.9	1.3
GWW	121	0	6	1.1	-0.4	106	0	3	0	3.6	0.8
GYM	24	0	4	1.4	-0.5	24	0	4	0	4.4	1.8
IBE	783	0	4	1.7	0.4	478	0	6	0	8.3	0.3
ICE	871	0	3	1.6	-0.2	782	0	3	0	6.7	0.8
IWD	47	0	0	1.2	0.0	21	0	0	0	6.9	0.6
KLM	984	0	4	1.7	-0.2	864	0	5	0	6.9	0.5
LAN	44	2	11	1.8	0.5	40	0	15	0	9.9	-0.9
LDI	246	0	4	1.4	-0.6	187	1	5	0	8.0	-1.0
LOT	121	0	4	1.9	-1.3	107	0	5	0	7.2	1.5
LTU	513	1	6	1.6	-0.3	461	0	5	0	6.1	0.5
LXR	26	12	15	1.2	-0.4	22	0	5	0	4.8	0.6
MAS	29	0	0	1.1	0.0	29	0	0	0	6.1	2.1
MON	65	2	8	1.9	0.3	56	0	11	0	9.9	1.3
MPD	68	1	6	2.1	0.5	42	0	2	0	6.6	0.4
MPH	448	0	2	1.8	-0.8	411	0	2	0	7.2	0.1
MYT	182	1	2	1.6	-0.1	181	0	4	0	7.7	0.0
NCA	37	0	3	1.7	0.6	24	0	0	0	4.5	1.2
NWA	3304	1	4	1.9	0.2	3250	0	3	0	6.7	0.4
OAE	70	0	9	2.1	-0.6	70	1	29	0	13.5	5.7
OOM	35	0	14	2.9	2.6	32	3	13	0	4.7	0.2
PAC	236	0	7	1.9	0.0	235	0	7	0	6.8	0.6
RAM	198	2	6	2.0	0.4	133	1	100	0	9.6	-0.3
RCH	252	0	14	2.9	0.4	216	0	100	0	11.3	1.8
RZO	207	0	3	1.5	-0.5	160	0	5	0	8.1	0.0
SEU	68	1	1	1.3	0.0	62	0	2	0	6.1	0.9
SLR	148	0	11	1.4	-0.1	142	1	13	0	5.9	0.4
SSV	53	0	6	1.3	-0.3	48	0	4	0	4.1	0.6
TAP	212	0	6	1.8	-0.4	127	0	7	0	9.6	0.5
THT	36	0	0	1.3	-0.5	30	0	13	0	11.1	-0.3
TSC	159	1	2	1.7	0.0	122	0	5	0	6.9	0.9
UAL	263	0	56	2.2	-1.0	247	0	59	0	8.6	0.5
UPS	1107	0	45	1.7	-0.1	1086	0	45	0	7.3	0.3
USA	37	3	11	2.1	-0.1	32	0	13	0	8.1	1.0
VIR	192	2	3	1.7	-0.2	174	1	4	0	7.1	0.3
WOA	348	0	6	1.7	0.0	350	0	11	0	9.8	1.5
9VS	133	0	2	1.2	0.0	123	0	1	0	4.0	0.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
EU	25558	0	16	1.3	0.1	25558	0	16	0	4.3	0.4
KL	748	0	12	1.4	0.8	745	0	12	0	6.5	1.2

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
N	2605	0	14	1.7	0.1	2466	0	14	0	5.2	0.8
US ACARS	20917	10	39	1.4	0.2	20917	0	30	0	5.0	0.4

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.1	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	21	0	17.0	23.4	16.0
DBBH	12	Z	100	18	0	20.7	36.0	29.5
DBLK	12	Z	100	13	0	23.6	32.2	22.0
EBUQ	12	Z	100	18	0	19.4	20.4	-6.4
ELML7	00	Z	100	18	0	12.5	12.9	3.3
ELML7	12	Z	100	17	0	14.9	18.5	11.0
FNPH	00	Z	100	10	0	8.6	25.4	-23.9
FNPH	12	Z	100	4	1	10.4	26.6	-24.5
FNRS	00	Z	100	5	0	26.2	35.8	-24.4
FNRS	12	Z	100	5	0	25.9	27.3	-8.8
KHRH	00	Z	100	10	2	54.6	55.8	-11.9
KHRH	12	Z	100	10	2	24.7	28.3	13.7
LDWR	00	Z	100	29	0	8.4	13.0	9.9
LDWR	12	Z	100	26	0	10.7	10.8	1.4
OXVH2	00	Z	100	4	0	4.3	18.7	18.3
OXVH2	12	Z	100	3	0	4.2	23.7	23.3
OXYH2	00	Z	100	7	1	11.5	19.1	15.3
OXYH2	12	Z	100	5	0	18.8	21.7	10.8
SHIPCK	00	Z	100	3	0	6.2	7.3	4.0
SHIPCK	12	Z	100	1	0	0.0	46.0	46.0
V2XM	00	Z	100	3	0	33.3	33.4	2.0
V2XM	12	Z	100	4	0	8.8	12.8	9.3
WPKD	00	Z	100	6	0	8.2	9.0	-3.8
WPKD	12	Z	100	5	0	30.3	30.6	4.0
ZCBP6	00	Z	100	3	0	27.8	33.7	19.0
ZCBP6	12	Z	100	7	0	19.4	50.1	46.1
03953	00	Z	100	28	0	10.5	24.1	21.7
03953	12	Z	100	27	0	10.8	14.9	10.3
04018	00	Z	100	28	0	10.3	21.1	18.4
04018	12	Z	100	27	0	19.8	25.6	16.2
04220	00	Z	100	27	0	9.6	19.5	17.0
04220	12	Z	100	26	0	8.5	17.8	15.7
04270	00	Z	100	27	0	9.5	22.6	20.5
04270	12	Z	100	26	0	7.8	22.3	20.9
04339	00	Z	100	28	0	7.3	21.5	20.3
04339	12	Z	100	26	0	10.2	24.5	22.3
04360	00	Z	100	27	1	11.0	25.7	23.3
04360	12	Z	100	25	0	8.4	27.5	26.2
08001	00	Z	100	25	0	20.2	23.6	-12.3
08001	12	Z	100	22	1	28.4	32.5	-15.8
08508	12	Z	100	25	0	13.0	21.9	17.6
08522	12	Z	100	26	0	9.0	18.1	15.7
08594	12	Z	100	18	0	18.6	21.3	-10.3
71600	00	Z	100	29	0	8.8	9.4	3.2
71600	12	Z	100	26	0	15.5	17.3	7.7
72201	00	Z	100	28	0	11.3	27.7	25.3
72201	12	Z	100	26	0	14.2	32.0	28.7
72402	00	Z	100	27	0	15.3	51.9	49.6
72402	12	Z	100	26	0	11.6	60.1	58.9
74494	00	Z	100	27	0	11.1	20.9	17.7
74494	12	Z	100	24	0	10.9	14.7	9.9
78016	00	Z	100	28	0	12.4	22.3	18.5
78016	12	Z	100	26	0	12.0	22.7	19.3

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.1	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	21	0	9.7	9.8	1.4
DBBH	12	Z	500	19	0	8.1	10.6	6.9
DBLK	12	Z	500	14	0	16.9	17.1	3.1
EBUQ	12	Z	500	18	0	11.6	14.7	-9.1
ELML7	00	Z	500	22	0	9.1	11.8	-7.4
ELML7	12	Z	500	19	0	6.7	6.7	-0.2
FNPH	00	Z	500	11	0	5.2	12.2	-11.1
FNPH	12	Z	500	4	1	5.4	7.4	-5.0
FNRS	00	Z	500	7	0	11.7	21.4	-17.9
FNRS	12	Z	500	6	0	13.9	16.2	-8.3
KHRH	00	Z	500	11	2	34.6	35.1	-5.9
KHRH	12	Z	500	12	1	32.9	35.1	12.3
LDWR	00	Z	500	29	0	6.2	6.2	0.2
LDWR	12	Z	500	26	0	6.8	7.0	-1.6
OXVH2	00	Z	500	4	0	8.2	18.9	17.0
OXVH2	12	Z	500	3	0	5.1	22.6	22.0
OXYH2	00	Z	500	7	1	6.6	15.2	13.7
OXYH2	12	Z	500	5	0	10.1	22.0	19.6
SHIPCK	00	Z	500	4	0	14.0	14.1	1.8
SHIPCK	12	Z	500	1	0	0.0	6.0	6.0
V2XM	00	Z	500	4	0	20.0	20.1	-2.3
V2XM	12	Z	500	6	0	12.1	12.1	-0.3
WPKD	00	Z	500	8	0	6.0	7.1	-3.9
WPKD	12	Z	500	5	0	10.4	12.1	6.2
ZCBP6	00	Z	500	3	0	9.9	18.8	16.0
ZCBP6	12	Z	500	7	0	7.7	35.7	34.9
03953	00	Z	500	28	0	9.6	11.1	5.6
03953	12	Z	500	27	0	7.4	8.0	3.0
04018	00	Z	500	28	0	7.8	13.1	10.6
04018	12	Z	500	27	0	18.4	21.7	11.5
04220	00	Z	500	27	0	7.6	13.6	11.3
04220	12	Z	500	26	0	6.5	13.7	12.0
04270	00	Z	500	28	0	7.6	12.2	9.5
04270	12	Z	500	26	0	9.5	16.0	12.8
04339	00	Z	500	28	0	5.7	13.9	12.7
04339	12	Z	500	26	0	7.9	14.3	12.0
04360	00	Z	500	27	1	6.5	14.2	12.6
04360	12	Z	500	25	0	6.5	17.2	15.9
08001	00	Z	500	26	0	11.0	14.7	-9.7
08001	12	Z	500	24	1	15.3	19.5	-12.0
08508	12	Z	500	25	0	7.6	7.7	1.6
08522	12	Z	500	26	0	5.6	5.9	1.9
08594	12	Z	500	23	0	7.7	13.4	-11.0
71600	00	Z	500	29	0	8.0	8.6	-3.1
71600	12	Z	500	26	0	7.6	8.4	3.6
72201	00	Z	500	29	0	4.2	4.3	-0.8
72201	12	Z	500	27	0	4.8	4.9	-0.6
72402	00	Z	500	28	0	7.3	8.2	3.8
72402	12	Z	500	27	0	6.7	8.6	5.3
74494	00	Z	500	28	0	8.6	8.7	1.1
74494	12	Z	500	27	0	7.1	7.5	2.5
78016	00	Z	500	29	0	4.5	8.1	6.8
78016	12	Z	500	27	0	6.4	12.5	10.7

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	21	0	0	4.7	-1.5	0.3
DBBH	12	V	100	17	0	0	4.7	-0.1	0.8
DBLK	12	V	100	13	0	0	2.5	-0.2	0.6
EBUQ	12	V	100	17	0	0	6.8	-1.7	-0.1
ELML7	00	V	100	16	0	0	7.1	1.2	-1.7
ELML7	12	V	100	15	0	0	5.3	-0.6	-1.7
FNPH	00	V	100	10	0	0	3.9	0.1	-0.2
FNPH	12	V	100	5	0	0	6.6	1.8	-2.7
FNRS	00	V	100	5	0	0	3.7	0.7	0.0
FNRS	12	V	100	5	0	0	3.4	2.4	-0.4
KHRH	00	V	100	10	0	0	3.9	-0.7	0.3
KHRH	12	V	100	12	0	0	4.1	0.0	1.3
LDWR	00	V	100	29	0	0	1.5	0.4	0.0
LDWR	12	V	100	26	0	0	1.4	0.0	0.0
OXVH2	00	V	100	4	0	0	1.7	0.3	-0.2
OXVH2	12	V	100	3	0	0	1.9	0.4	-0.8
OXYH2	00	V	100	5	0	0	2.3	-0.6	0.4
OXYH2	12	V	100	3	0	0	2.3	1.8	-0.8
SHIPCK	00	V	100	2	0	0	0.9	0.5	-0.5
V2XM	00	V	100	3	0	0	1.8	0.0	1.3
V2XM	12	V	100	3	0	0	1.5	-0.2	-0.9
WPKD	00	V	100	6	0	0	2.4	0.0	0.1
WPKD	12	V	100	5	0	0	3.1	0.2	1.0
ZCBP6	00	V	100	2	0	0	3.3	-0.7	-1.9
ZCBP6	12	V	100	6	0	0	3.6	0.8	0.7
03953	00	V	100	28	0	0	3.0	-0.2	0.2
03953	12	V	100	27	0	0	2.7	0.6	-0.3
04018	00	V	100	27	0	0	1.9	0.0	0.2
04018	12	V	100	27	0	0	2.1	-0.5	-0.1
04220	00	V	100	27	0	0	2.4	-0.6	-0.2
04220	12	V	100	26	0	0	2.0	-0.3	0.3
04270	00	V	100	27	0	0	2.9	-0.3	-0.3
04270	12	V	100	26	0	0	2.9	-0.1	-0.3
04339	00	V	100	25	0	0	5.1	0.3	-0.5
04339	12	V	100	24	0	4	6.8	-1.3	0.9
04360	00	V	100	27	0	0	2.5	-0.3	0.9
04360	12	V	100	25	0	0	1.9	-0.3	-0.3
08001	00	V	100	23	0	0	4.1	0.7	0.4
08001	12	V	100	21	0	0	2.9	0.3	0.1
08508	12	V	100	16	0	0	2.8	-0.1	-0.4
08522	12	V	100	24	0	0	4.7	1.9	-0.8
08594	12	V	100	19	0	100	3.7	-1.1	-1.4
71600	00	V	100	29	0	0	3.2	0.4	0.8
71600	12	V	100	26	0	0	3.5	0.3	-0.4
72201	00	V	100	28	0	0	2.6	-0.1	-1.1
72201	12	V	100	26	0	0	2.8	0.8	-0.5
72402	00	V	100	26	0	0	2.6	0.4	-0.8
72402	12	V	100	26	0	0	3.2	-0.4	-0.1
74494	00	V	100	27	0	100	2.4	0.0	-0.2
74494	12	V	100	24	0	100	2.6	-0.5	0.3
78016	00	V	100	28	0	0	4.1	-0.2	-0.5
78016	12	V	100	26	0	0	3.1	0.2	0.1

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.2	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	21	0	0	3.3	-0.6	-0.4
DBBH	12	V	500	18	0	0	3.5	-0.4	-1.5
DBLK	12	V	500	13	0	0	3.2	0.7	0.6
EBUQ	12	V	500	18	0	0	4.6	-1.1	-0.3
ELML7	00	V	500	19	0	0	3.4	0.5	-0.5
ELML7	12	V	500	16	0	0	3.6	0.4	-0.1
FNPH	00	V	500	11	0	0	2.5	0.1	-0.6
FNPH	12	V	500	5	0	0	3.4	-0.2	0.0
FNRS	00	V	500	7	0	0	4.6	-2.0	-0.3
FNRS	12	V	500	7	0	0	4.3	0.8	2.3
KHRH	00	V	500	12	0	0	4.1	0.5	0.1
KHRH	12	V	500	13	0	0	4.7	0.5	-0.7
LDWR	00	V	500	29	0	0	2.9	0.6	-0.2
LDWR	12	V	500	26	0	0	2.9	-0.2	-1.1
OXVH2	00	V	500	4	0	0	3.7	1.0	-3.1
OXVH2	12	V	500	3	0	0	6.7	-2.0	1.0
OXYH2	00	V	500	6	0	0	2.7	0.2	0.5
OXYH2	12	V	500	3	0	0	3.7	0.1	-2.8
SHIPCK	00	V	500	4	0	0	3.9	-0.9	-2.1
SHIPCK	12	V	500	1	0	0	1.5	-1.5	-0.3
V2XM	00	V	500	4	0	0	3.3	0.5	-0.7
V2XM	12	V	500	6	0	0	3.0	-0.5	0.3
WPKD	00	V	500	6	0	0	2.8	0.5	0.2
WPKD	12	V	500	5	0	0	3.0	1.0	0.8
ZCBP6	00	V	500	3	0	0	2.3	-1.6	-0.6
ZCBP6	12	V	500	6	0	0	6.1	-2.9	-1.1
03953	00	V	500	28	0	0	4.7	-0.6	0.4
03953	12	V	500	27	0	0	4.0	1.3	0.1
04018	00	V	500	28	0	0	3.7	0.2	-1.0
04018	12	V	500	27	0	0	4.9	-0.4	0.1
04220	00	V	500	26	1	0	3.2	-0.1	-0.9
04220	12	V	500	25	0	0	3.1	-0.2	-0.7
04270	00	V	500	28	0	0	3.5	0.3	-0.2
04270	12	V	500	26	0	0	4.6	0.2	-0.2
04339	00	V	500	28	0	0	4.4	-0.2	-0.2
04339	12	V	500	26	0	0	4.1	-0.5	1.1
04360	00	V	500	26	0	0	3.6	-0.8	0.5
04360	12	V	500	25	0	0	3.5	0.1	-0.6
08001	00	V	500	25	0	0	4.6	0.1	-0.1
08001	12	V	500	25	0	0	3.8	-0.9	0.0
08508	12	V	500	16	0	0	3.6	-0.5	-0.7
08522	12	V	500	25	0	0	3.0	0.1	-0.2
08594	12	V	500	24	0	100	5.0	-1.0	-2.7
71600	00	V	500	29	0	0	3.3	0.0	0.6
71600	12	V	500	26	0	0	3.4	0.0	0.6
72201	00	V	500	28	0	0	2.5	-0.8	-0.1
72201	12	V	500	27	0	0	2.4	0.0	-0.6
72402	00	V	500	28	0	0	3.3	0.5	0.0
72402	12	V	500	26	0	0	3.8	0.1	0.7
74494	00	V	500	27	0	100	3.2	-0.6	0.2
74494	12	V	500	27	0	100	3.7	0.1	1.3
78016	00	V	500	29	0	0	3.3	-0.6	0.3
78016	12	V	500	27	0	0	2.7	0.0	-0.1

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45